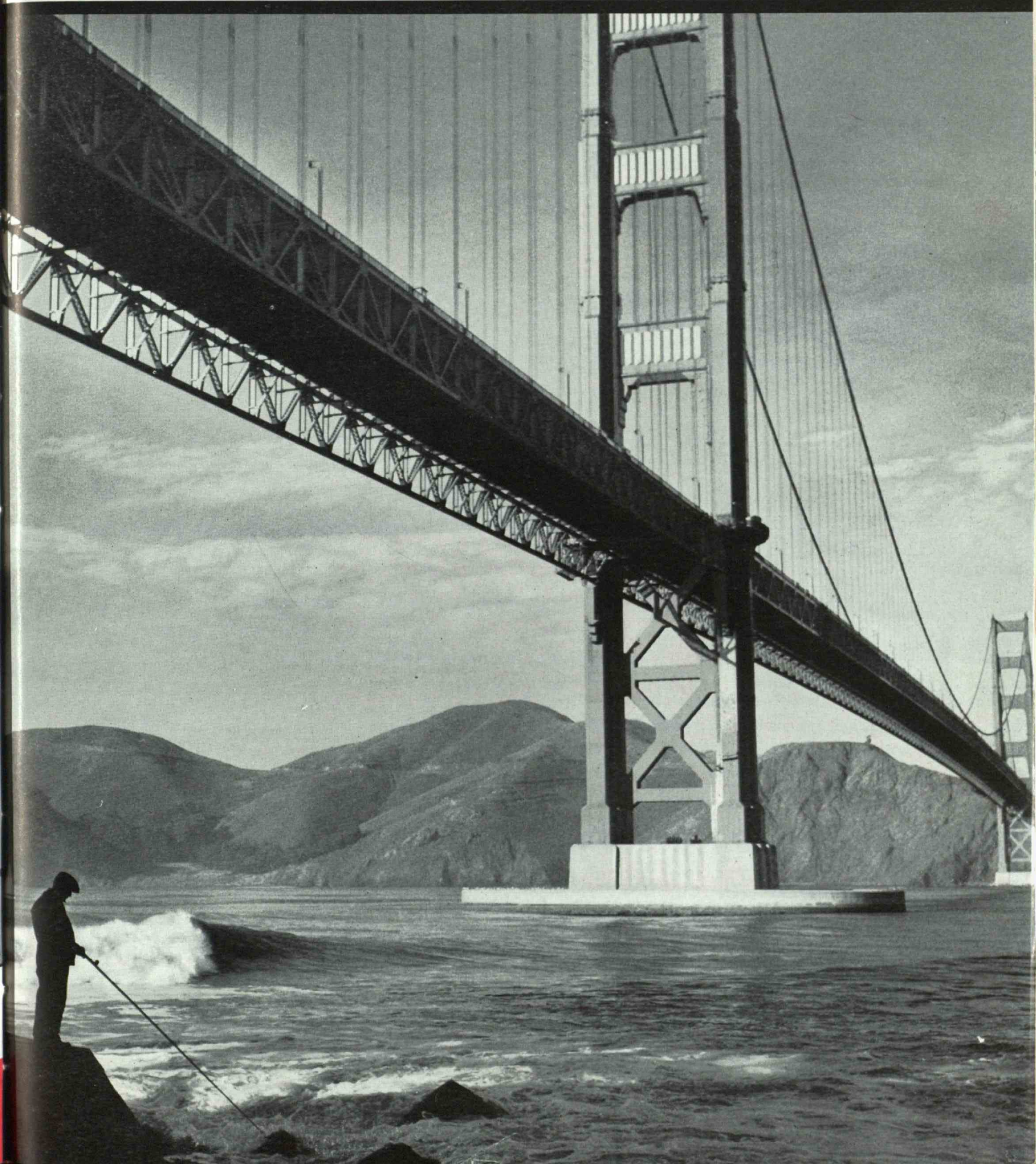


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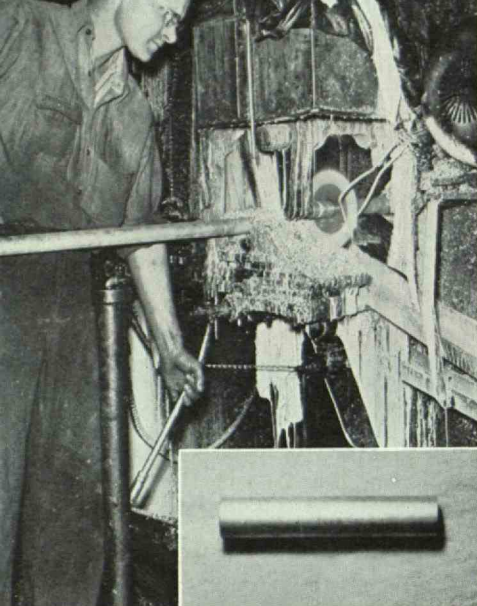
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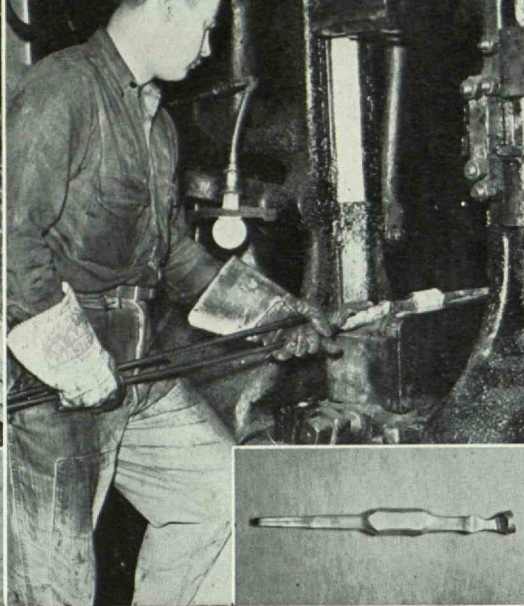
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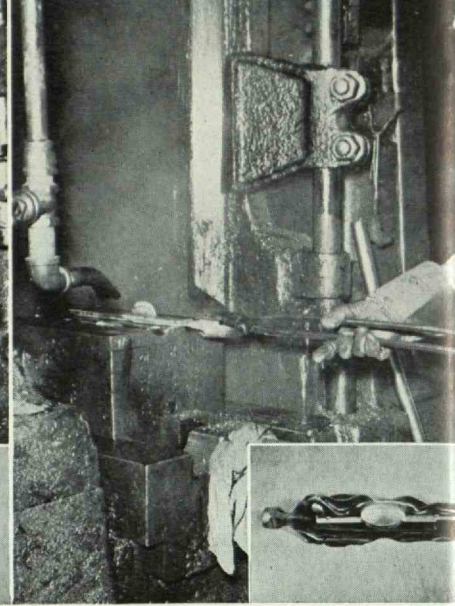
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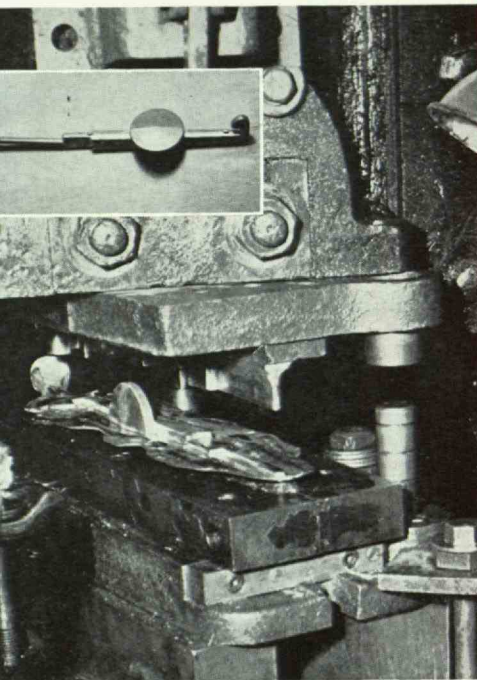
Cutting Bar



Lengthening and Shaping



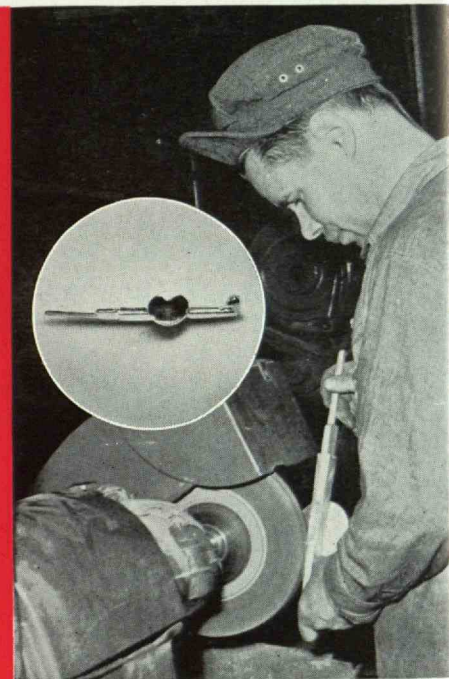
Shaping to the Die



Trimming the Flash

FORGING ALUMINUM

into
Pressure Cooker Tops



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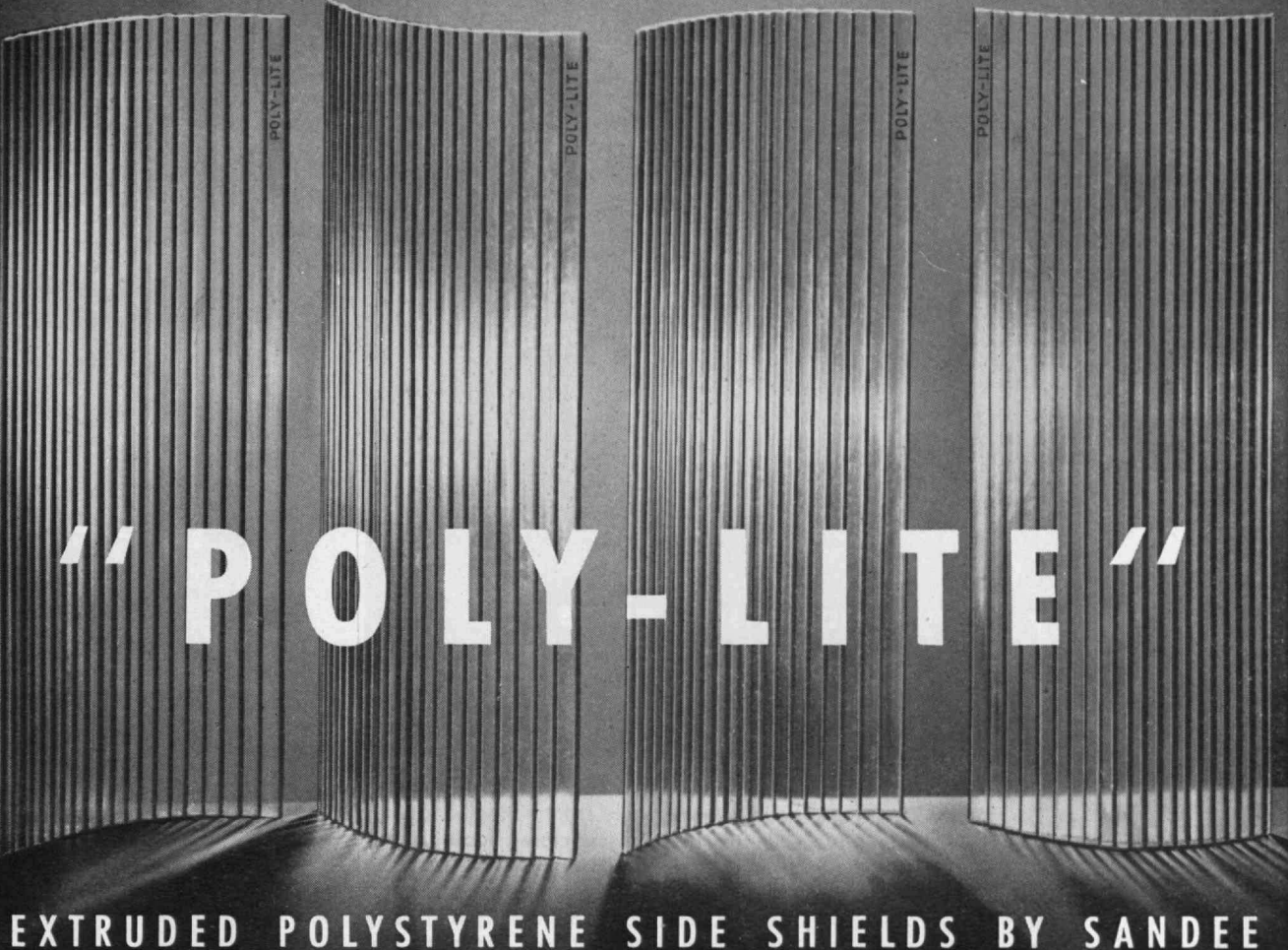
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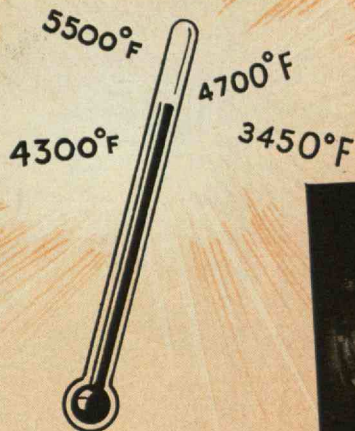
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LMT-60DDG	60-60	15,000v.	24.05	LMT-150D	150	15,000v.	18.50
LMT-100DBG	100-100	10,000v.	16.25	LMT-100D	100	15,000v.	16.60
LMT-60DBG	60-60	10,000v.	23.05	LMT-50D	50	15,000v.	11.50
LMT-200DAG	200-200	7,500v.	28.50	LMT-245B	245	10,000v.	20.15
LMT-100DAG	100-100	7,500v.	24.05	LMT-150B	150	10,000v.	18.35
DOUBLE STATOR MODELS				LMT-100B	100	10,000v.	17.55
LMT-30DE	30-30 Mmf.	20,000v.	\$18.55	LMT-75B	75	10,000v.	12.80
LMT-60DD	60-60	15,000v.	20.15	LMT-500A	500	7,500v.	24.60
LMT-100DB	100-100	10,000v.	12.35	LMT-350A	350	7,500v.	19.65
LMT-60DB	60-60	10,000v.	19.15	LMT-250A	250	7,500v.	18.35
LMT-200DA	200-200	7,500v.	24.60				
LMT-100DA	100-100	7,500v.	20.15				

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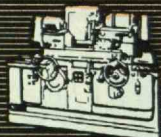
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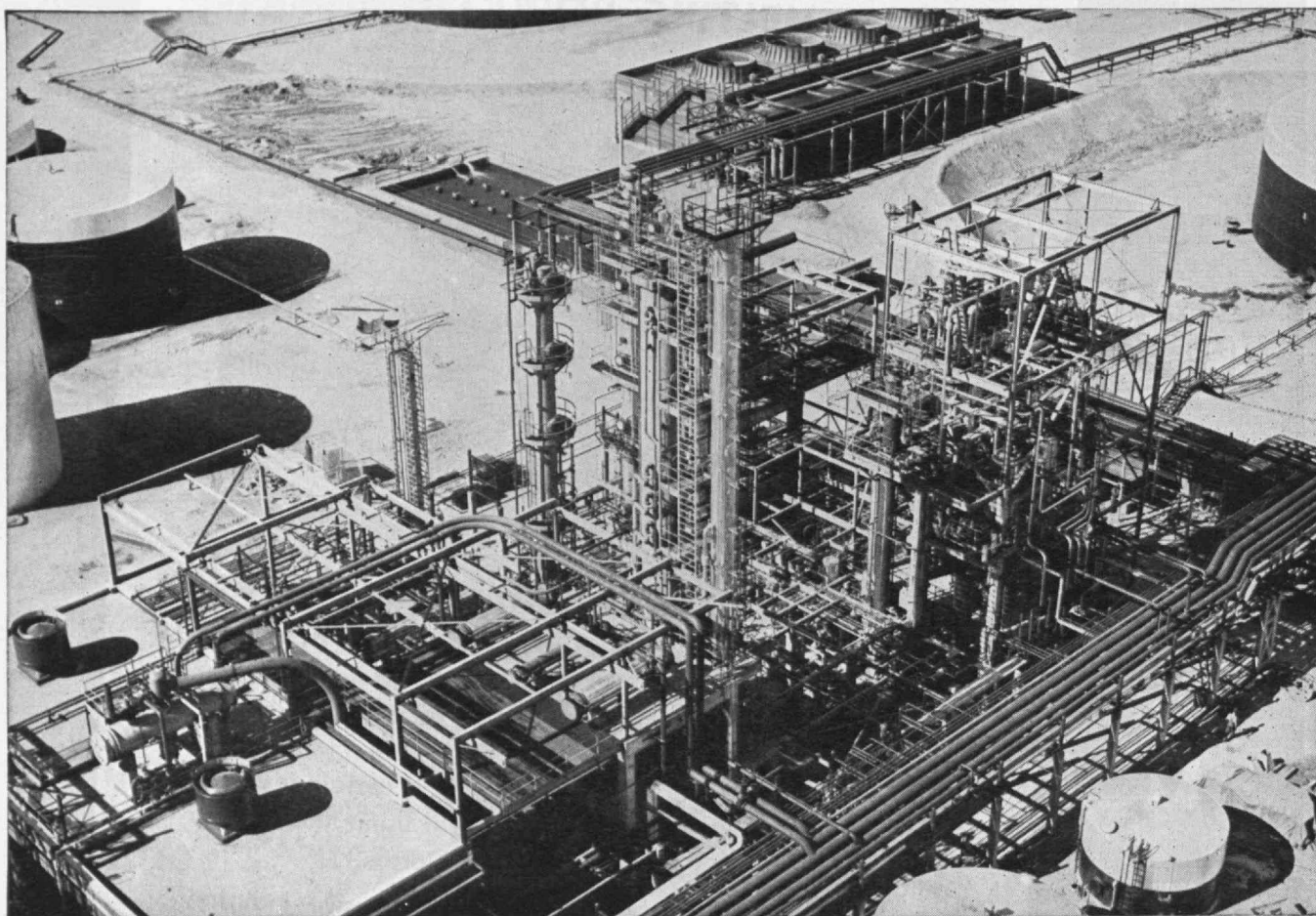


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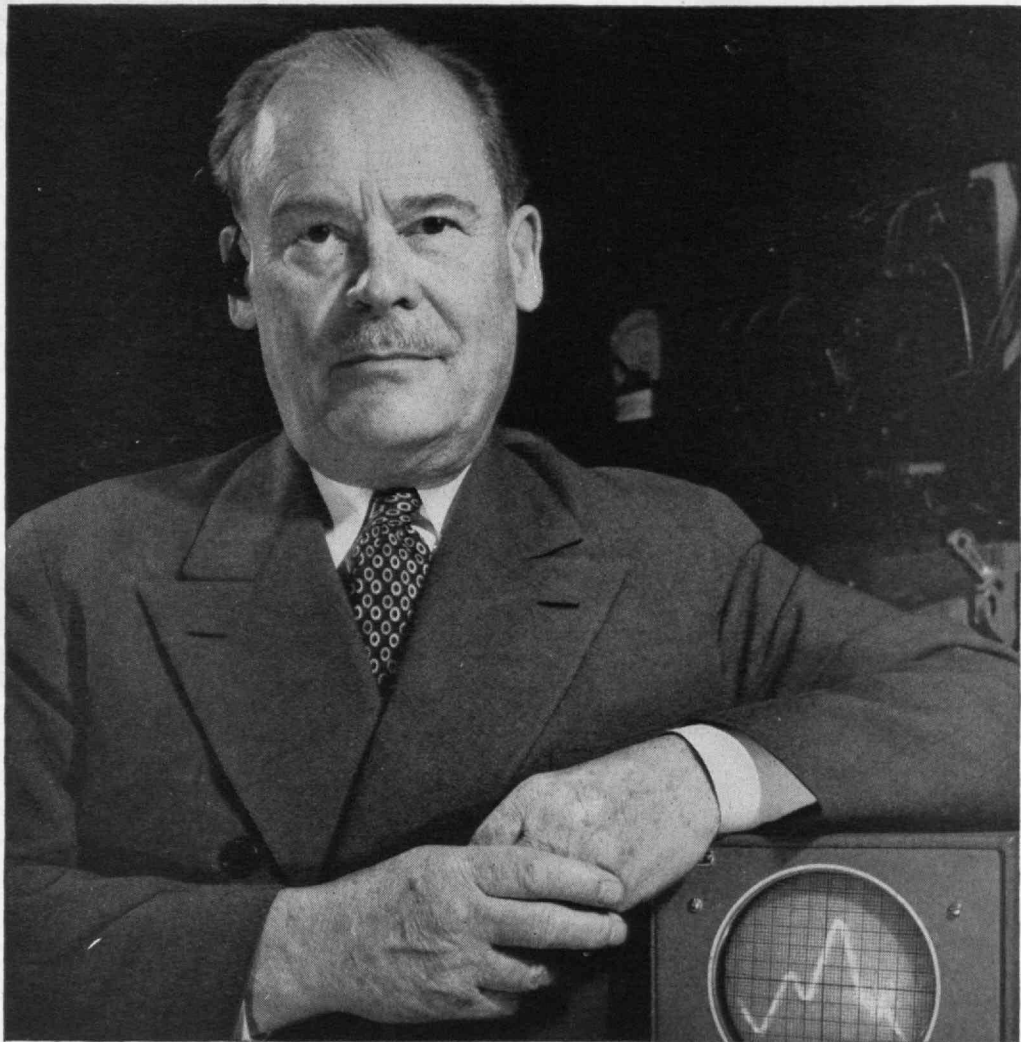
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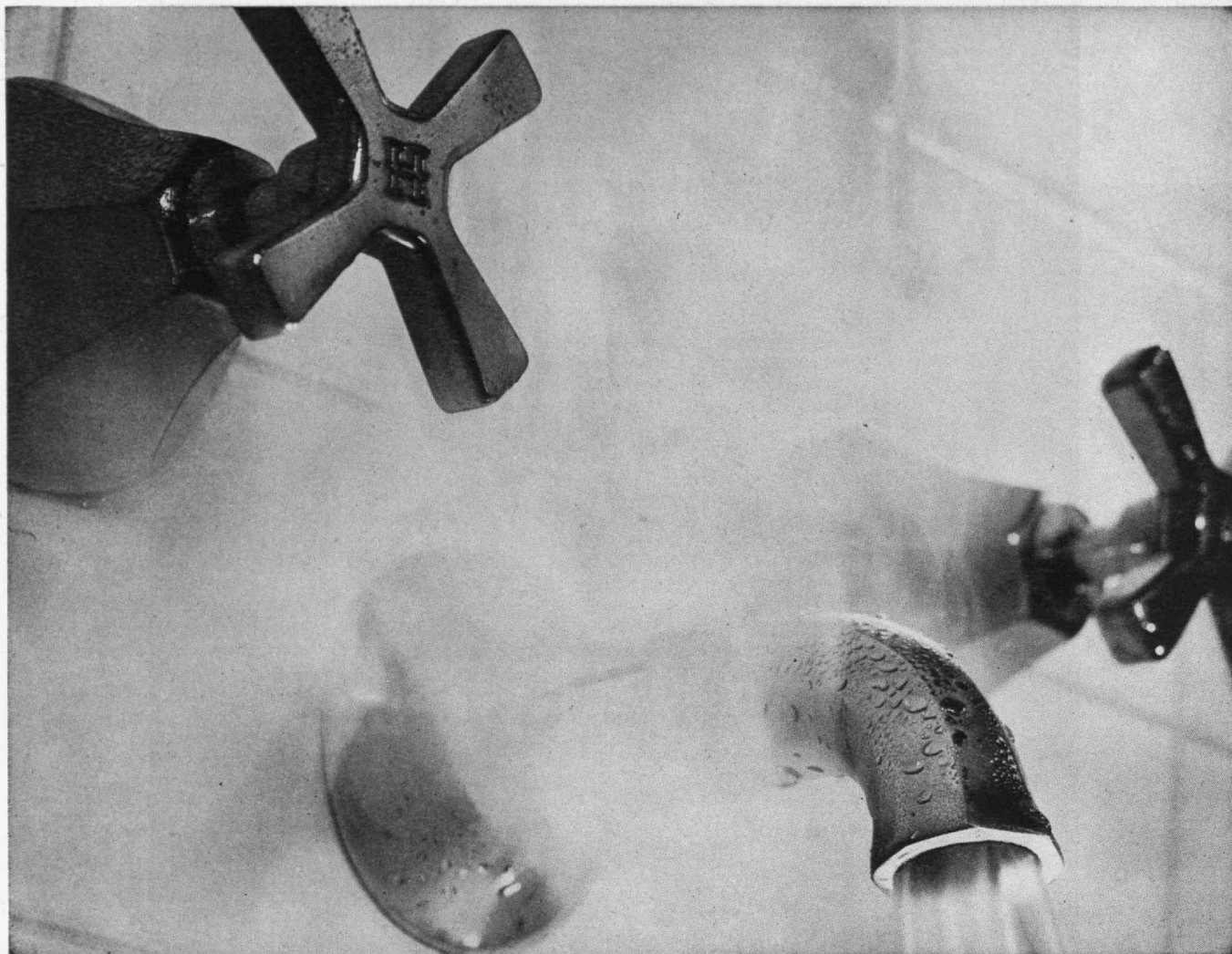
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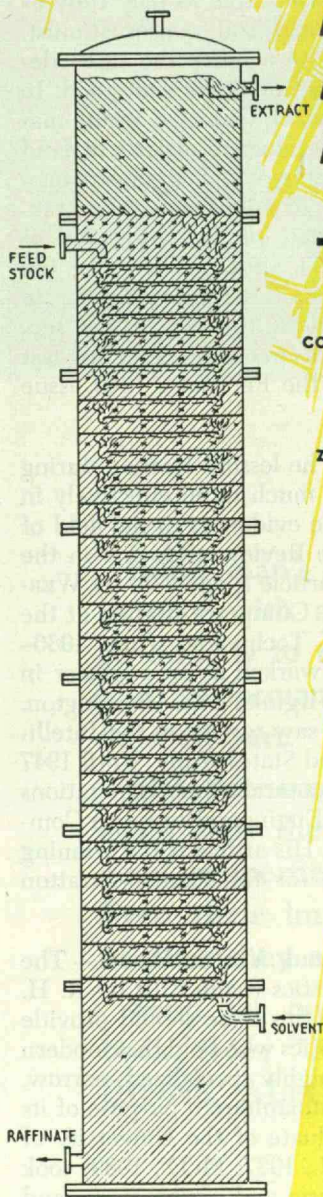
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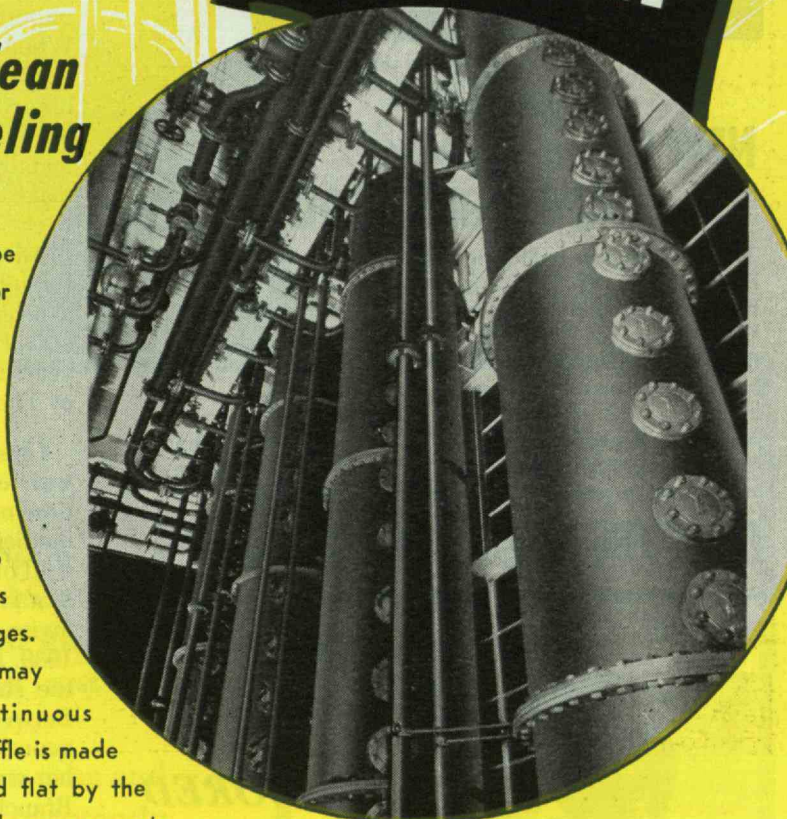


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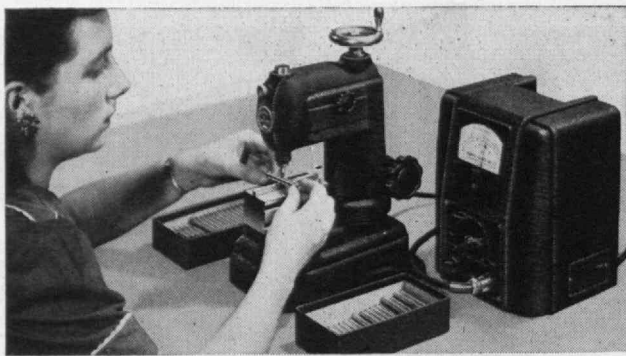
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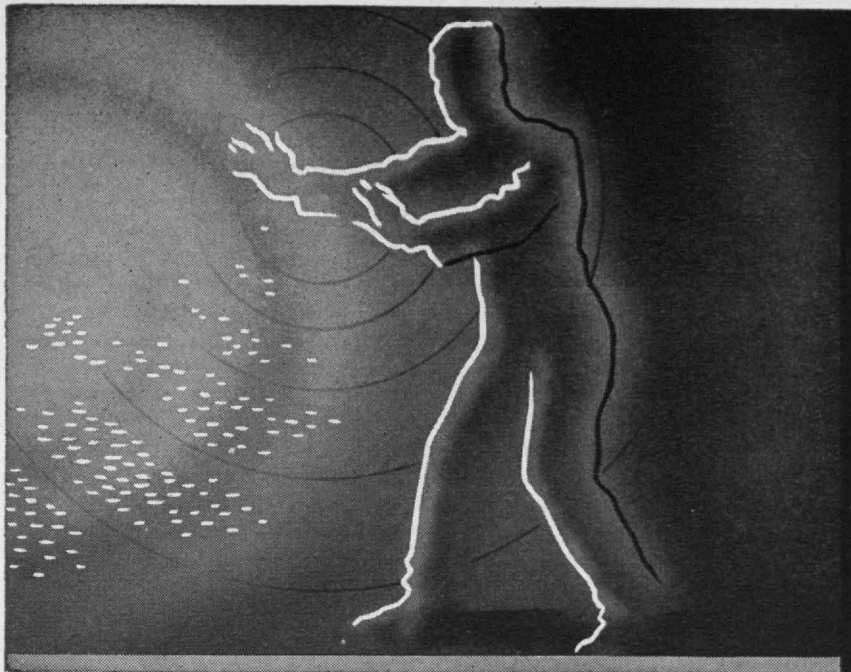
DIEFENDORF GEARS

THE TABULAR VIEW

Earth-Wise Engineers. — With the world's population increasing rapidly, and the arable regions suitable for agriculture, limited in extent, one of the world's major problems is that of preserving and making the fullest possible uses of natural resources. In this problem the engineer has a role to play fully as important as the professional soil conservationist. When both work together, to achieve the same desirable aims, the result cannot be other than good. In his article (page 269) EDWARD H. GRAHAM, whose major field is botany and the ecological aspects of land management, outlines means by which engineers may make effective contributions to soil-conservation practices. Dr. Graham, a graduate of the University of Pittsburgh (B.S., 1927; Ph.D., 1932), is chief of the Biology Division of the Soil Conservation Service in Washington, D.C. His article in this issue is the second of two lectures to students in civil engineering last year; the first appeared in the February, 1949, issue of *The Review*.

Closed for Repairs. — The lessons learned during wars often serve humanity much more effectively in time of peace. To the ample evidences in the field of medicine, this issue of *The Review* adds one in the field of engineering in the article (page 275) by WERNER H. GUMPERTZ, '48. Mr. Gumpertz studied at the Swiss Federal Institute of Technology from 1936-1939, and from 1940-1943 worked as an engineer in the states of New York, Virginia, and Washington. Between 1943 and 1946 he saw service in the Intelligence Division of the United States Army. Until 1947 he was head of the Structural Unit, Operations Branch, Office of the Chief Engineer, European Command, United States Army. His article is the winning paper submitted last June for the Samuel Stratton Prize for undergraduates.

Microphone Buttons and Violin Bows. — The story on architectural acoustics (page 279) by R. H. BOLT and A. M. CLARKE in this issue should provide ample refutation to those critics who hold that modern technical education is too highly specialized, narrow, and fails to recognize the humanitarian purpose of its objectives. Dr. Bolt, a graduate of the University of California (A.B., 1933; A.M., 1937; Ph.D., 1939) took undergraduate work in music and architecture, and graduate work in physics, education, and engineering. His diversified training is put to good use in organizing and directing the graduate program in acoustics. He has been at M.I.T. since 1939, and director of the Institute's Acoustics Laboratory since its formation in 1946. Dr. Bolt is president-elect of the Acoustical Society of America and will assume duties of this elective post in May. Currently editor of the *Acoustics Laboratory reports*, A. M. Clarke has been associate editor of the *Office of Scientific Research and Development-sponsored publication Radar* of the Army Air Forces, and assistant editor of *Radar Systems Engineering*, one of 29 volumes in the *Radiation Laboratory Series*.



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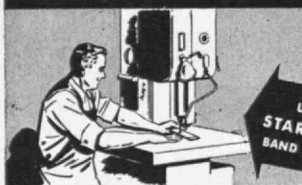
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MAIL RETURNS

Comment on Engineering Membership

FROM JAMES F. FOUHY, '05:

I am calling your attention to an omission in your February issue on the chart shown on page 212 and entitled "Growth of Membership of Engineering Societies in the United States." You show charts for a number of societies, but neglect entirely the National Society of Professional Engineers. This organization, according to the January, 1949, edition of its magazine *American Engineer* had a membership on November 30, 1948, of 19,164.

The National Society of Professional Engineers is the only organization of engineers, insofar as I know, which consists entirely of engineers licensed by their respective states. Considering this point, and the further fact that membership is easily acquired in many of the societies shown on the diagram, it would appear that a gross error has been made, and in the opinion of the writer should be rectified in an early number.

Incidentally, the executive director of the National Society of Professional Engineers is a Technology graduate. His name is Paul H. Robbins of the Class of 1936. New York, N. Y.

[The Review is pleased to have, and to publish, Mr. Fouhy's comment on the membership of the National Society of Professional Engineers. The Trend of Affairs item in the February issue was intended merely to provide some measure, however rough, of the growth of engineering in the United States during the past three-quarters century. In presenting membership data on a few selected societies, it was obviously necessary to "neglect entirely" inclusion of figures for many engineering groups, including those of the National Society of Professional Engineers which, we are informed, was organized in 1934. We hasten to assure our readers — as well as Messrs. Fouhy and Robbins — that The Review had no intention of slighting any organization or group of engineers through errors of omission in presenting the data on "Our Engineering Population" in the February issue. — Ed.]

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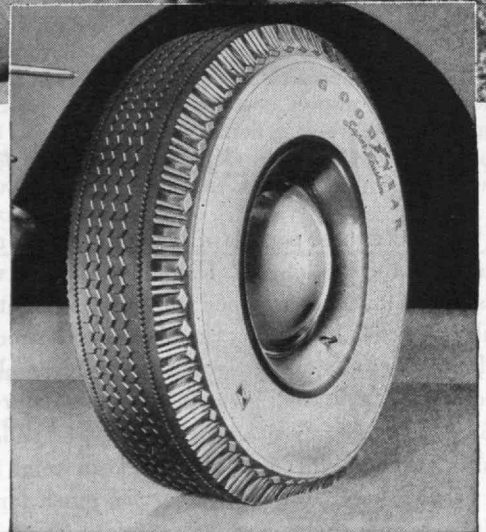
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Paul Cohen, '35

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A. Aubrey Bodine

Pattern in Optics

THE TECHNOLOGY REVIEW

Vol. 51, No. 5



March, 1949

The Trend of Affairs

This Artificial Life

TIME was when chicle and chewing gum were synonymous, and the inexorable demands of wagging American jaws provided security for thousands of Mexican laborers, and, weather permitting, many millions of dollars in American exchange. The lush of an earlier era has dwindled and now one of the problems facing the Mexican Government at the moment is what to do about the chicle gatherers in the Mexican states of Campeche, Quintana Roo, and Chiapas. These areas, down at the southern and rainy end of Mexico, produce about 90 per cent of the world's supply of chicle.

Chewing gum manufacturers have discovered that synthetic resins of the coumarone-indene type (known since the 1890's and made from coal-tar derivatives) form highly satisfactory bases for chewing gums. These resins find ready use because their viscosities can be controlled over a very wide range, and because they have ready compatibility with a large number of natural gums, waxes, oils and flavors. Other resins are also being used — or are under study — for use in the manufacture of chewing gum. Unlike raw chicle, which comes to this country in various grades and colors, and which must be vigorously cleaned of sand, dirt, bark and other assorted debris before further processing, the synthetic resins can be supplied to meet precisely defined specifications. At last reports they also appeared to hold some price advantage. Nor are they liable to become in short supply because of a season of low rainfall. Thus, research on synthetic resins has greatly affected the economic status of chicle gatherers of southern Mexico who may, perhaps, be excused for believing that "research is what makes securities insecure" as a banker once said. In Mexico efforts have been directed of late to the building up of a domestic chewing gum industry in order to keep chicle production somewhere near present levels.

Mexican output of chicle has been in the order of 20,000,000 pounds per year. This makes it one of the more substantial of our variegated imports of gums, roots, and other botanicals that total approximately 50,000 tons per year. For example, our food and medicinal industries find use for such imported roots as licorice, sarsaparilla, ipecac, gentian, galangal (ginger), Culver's, and jalap. While on this aspect of the American diet, it is interesting to observe that the production of synthetic medicinals is now on such a scale that it bears comparison with the use of natural products. This country produced nearly 10,000,000 pounds of acetylsalicylic acid (aspirin) in 1946, over 5,000,000 pounds of sulfa drugs, and considerably more than 1,000,000 pounds of the various vitamin B's, all of which are produced to ease the burden of our somewhat artificial lives.

Silver Bearings

THE massive industrial use of silver during the recent conflict, in such completely salvageable applications as bus bars and transformer windings, may be dismissed as an aspect of total war. More typical of the paradoxes that occasionally result from the interaction of engineering and economics is the growing use of silver in crankshaft and other heavy duty bearings. In 1947, about 360,000 pounds of a silver-lead "babbit" alloy was used in this country; and a fair amount of 99.5 per cent pure silver went into airplane-engine bearings.

The alloy contains only about 2.6 per cent of silver, the remainder being mainly lead and antimony, so that the total silver content in 1947 amounted to less than 10,000 pounds. Tin, the traditional base for bearing alloys, is a far more abundant metal than silver, total world production being 20 or 30 times as great. But when production from our own mines is considered, five tons of silver is an insignificant percent-

age; five tons of tin would represent virtually our total output in 1942, 1943, or 1944. Substitution, taking place on economic and engineering merits, is also bettering our position in regard to strategic materials.

Silver has much to recommend it as a bearing material. It is relatively tough and strong; it is the best heat conductor known; and it melts at a temperature high enough so that no minor or local overheating will cause a failure. On the other hand, it is not soft enough to permit an occasional grain of sand or grit to embed itself, and thus prevent scoring of smooth bearing surfaces. Lead, however, has high "embedability." Therefore the alloy.

In airplane-engine bearings, silver is used in quite another manner, for here the cost of material becomes irrelevant in the face of bettered performance. One of the few inescapable criteria that determine how big a reciprocating engine shall be for a given horsepower is the loading that its crankshaft bearings can take. In the airplane, particularly, a saving in weight in the engine is compounded many times in the over-all structure. Previous to the silver bearings, which are now standard in the industry, the bearings were of babbitt or copper-lead alloys backed up with steel to

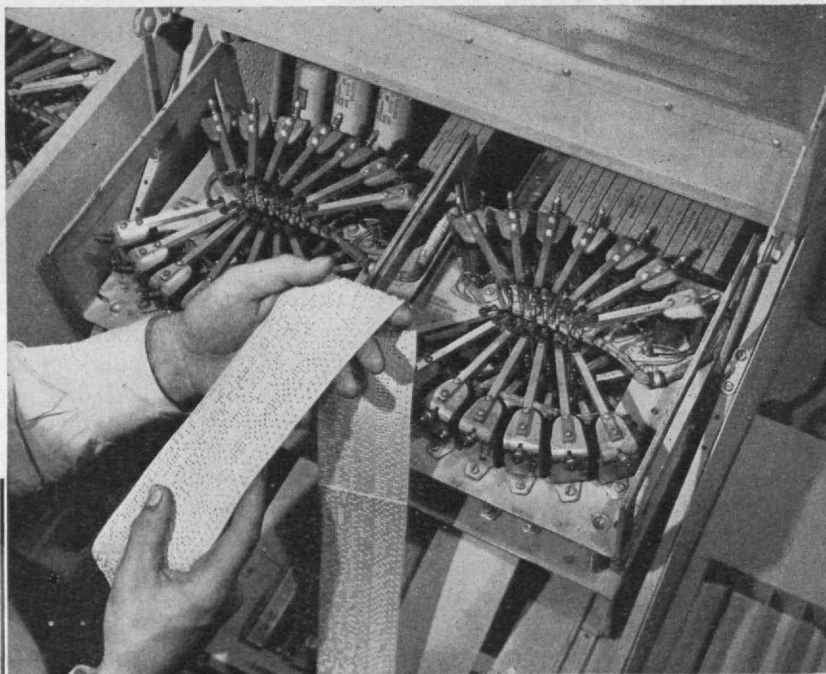
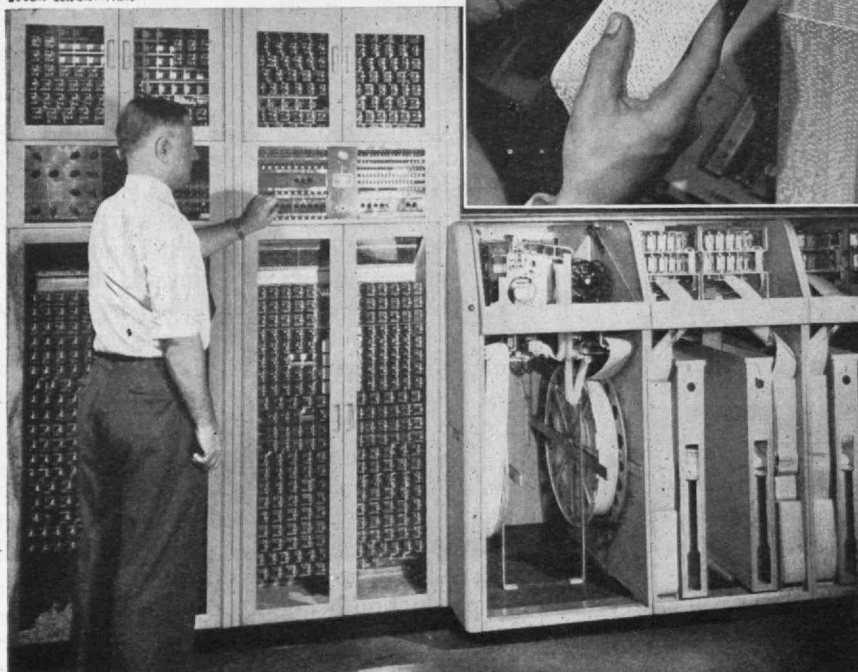
supply the compressive strength that these more "embedable" materials lacked.

Silver was introduced just before the beginning of World War II, but when used alone, performance was sometimes inconsistent because of its hardness. The cure proved to be a thin layer (about .001 inch) of lead electroplated over the silver. But lead tends to corrode in the lubricating oils used in airplane engines, and this layer, thinner than the ordinary sheet of paper, was soon alloyed with iridium or tin. The steel backing shell was of course retained. When it was found that silver cast directly against the steel did not give a sufficiently reliable bond, resort was made to electroplating. A thickness of about .020 inch is required, however, and silver is usually plated at a rate of about .001 inch per hour. Production methods have been developed, therefore, that permit .015 inch of silver to be deposited in an hour, with still faster rates possible in the laboratory. As a final refinement, the steel shell is struck with an extremely thin layer of copper or nickel to promote maximum adhesion of the silver. So, in effect, today's propeller-driven airplanes roll through the sky on a sandwich of steel, nickel, silver, and lead-iridium alloy.

Automatic Telephone Billing

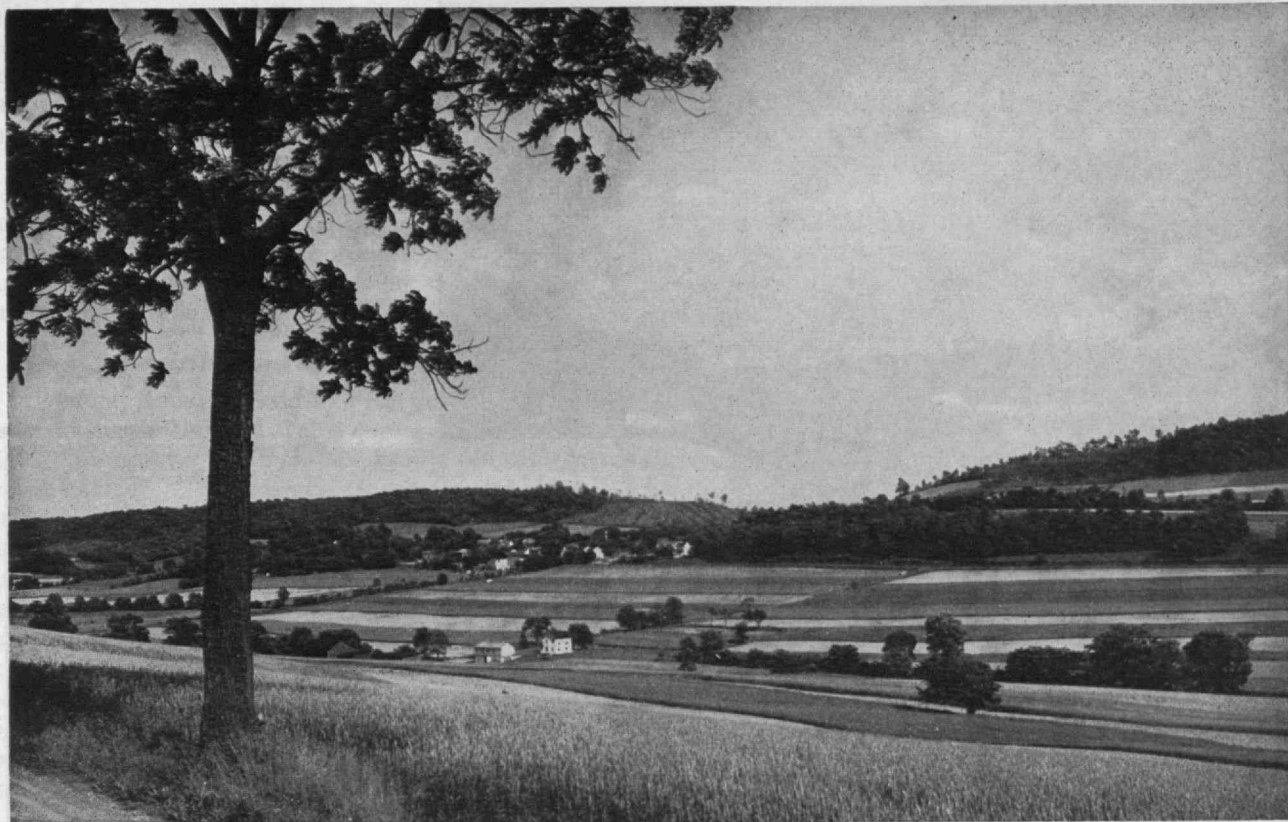
An automatic accounting system which can keep track of thousands of dial telephone calls is the latest contribution of the Bell Telephone Laboratories to telephone service. The new service, which will "remember" who made calls, what numbers were called, how long the conversations lasted, and then add up and print detailed charge information is regarded as one of the most significant advances in telephone engineering since the introduction of the dial system. First installation was made recently in Philadelphia.

Nick Lazarnick



Nick Lazarnick

(Above) Heart of the new automatic message accounting system is the tape-punching equipment. Punched paper tape contains information on the calling and called numbers, length of call, and date, for thousands of telephone calls. (Left) Coded punched tape is run through reader machines and the data punched on it are assembled, sorted, and summarized. Machines in the accounting center print individual bills from this data. A tape reel, such as that shown here, holds billing information for as many as 25,000 telephone calls.



Soil Conservation Service

ENGINEERING IN THE SERVICE OF Soil Conservation

*Without the Help of the Engineer We Cannot
Achieve Conservation of the Soil or Wise
Use of Any of Our Natural Resources*

By EDWARD H. GRAHAM

SOIL conservation is the use of land according to its capability, and the treatment of land according to its needs. This concept includes all kinds of land. Land is the base without which we could have no cultivated crops, no timber or wood products, no meat or livestock products, such as leather and wool, and no wild life. All of these renewable resources are dependent upon the soil. Without soil conservation these vital materials are endangered. Without soil conservation applied to the land we cannot have clear streams or ponds and reservoirs free of sediment.

One of the most important facts in conservation is that its phases are so closely interrelated that we cannot rightly think of one phase without consideration of the other. Forest conservation means little without conservation of the soil upon which trees depend for growth. Soil conservation is so closely related to water conservation that the two cannot rightly be separated. The technician who helps a farmer or rancher make a conservation plan for his land cannot do an adequate job unless he is trained and capable

of understanding something of the treatments required for cropland, pasture, wood lot, range land, wild-life land, and the water-control system needed on the entire acreage. In the thinking of this technician, and to a large extent in the mind of the farmer he works with, there must be a concept of the wholeness of the unit of land upon which they are working, and the understanding that whatever is done on one parcel of land may have its effect upon another.

This need for co-ordination is recognized by the Civil Service Commission in its requirements for the position of soil conservationist in the Federal government. The beginning soil conservationist is employed as a farm planner to help the farmer or rancher develop a conservation plan for an individual operating unit of land, and determine soil- and water-conservation practices needed.

To obtain a Federal job as a soil conservationist in the beginning professional grade, an applicant must have successfully completed a full four-year accredited college course, or its equivalent, in soil conserva-



Ward Allan Howe

◀ NORTHEAST

This pastoral scene in the Ischua Valley, near Franklinville, N.Y., is representative of the conditions to be found in the northeast part of the United States. The growing season is about a third of a year and rainfall varies from 30 to 50 inches. In this region of rolling and sloping land the major erosion is sheet erosion.

Soil Conservation Service

SOUTHEAST ▶

Gullies, some of them like miniature Grand Canyons, are common in the Southeast, as this photograph of a farm in Georgia clearly shows. Here, a non-co-operative farmer has just finished cutting off all timber and has piled it into gullies, merely adding to the already severe erosion in this part of the country.



tion or in a closely related agricultural science, including civil or hydraulic engineering. Emphasis is placed on the desirability of broadening the range of subject-matter courses in accordance with the co-ordinated approach to soil conservation work. It is desirable if the applicant has had at least one course in each of the following subject groups: soils or soil conservation; woodland management, plant ecology, or economic biology; farm crops or pasture management; feeds and feeding or animal nutrition; farm or ranch management or agricultural economics; and farm drainage or hydraulics, hydrology or plane surveying.

Some of these subjects may not represent much engineering and, in fact, several do not. The point is that no soil conservationist or farm planner can understand land capabilities and recommended treatments, or work intelligently with land operators, unless he knows enough about plane surveying to run lines for contour cultivation and and other simple conservation practices, and also knows enough about the behavior of water to call for the aid of an engineering specialist when one is needed. A simple understanding of the other sciences mentioned is likewise necessary.

The farm planner is responsible for recognizing the need for, and the inclusion of, the required engineering practices in the farm conservation plan. He must

have sufficient training to recognize the place of engineering in the plan, and at the same time, recognize his limitations in the design and layout of engineering practices and structures. Farm planners may do surveying and layout work necessary for the installation of engineering practices, such as terrace systems, vegetated waterways, field drains, and other works of similar nature, based on demonstrated ability.

The Soil Conservation Engineer

There are a great many soil- and water-conservation practices requiring special engineering skill that must be applied to the land as part of a complete conservation plan. They must be closely integrated with agronomic, forestry, range management, biological, and other practices to effectuate the plan. Without them, it is often impossible to make the other practices do the job they are intended to do. To design them and aid in their application, the services of a well-qualified engineer are necessary.

It may be well at this point to mention some of the engineering practices used in soil- and water-conservation work. Some of the most generally useful of them are contour furrowing, diversion channels, drainage, including use of covered and open drains, water storage and soil-saving dams, diversion dams,

spring development, wells, construction of canals, farm water distribution systems, land leveling, controlled flooding of irrigated fields, construction of outlets and farm water courses, water-spreading systems, and terracing. Many of these practices are applicable to cropland. Some are also useful in pastures or on western range land. Others are especially useful in irrigated sections. Some can be used in woodland or in marshes and swamps. Soil-conservation practices requiring the services of an engineer are not confined to any particular type of land.

Contributions of Engineers

In general it may be said that the contributions of the engineer to soil and water conservation may be divided into five segments, namely: (1) Water disposal systems, including terraces, diversions, protected outlets, ponds, and drainage of wet lands; (2) Group water disposal systems, such as outlet drainage, and large gully works; (3) Water utilization, such as land conditioning and water application practices for irrigation, water supply, and water spreading; (4) Group irrigation projects, including the development or improvement of supply and delivery to irrigated farms; and (5) Special engineering works for flood and sediment control, highway erosion control, stream channel improvements, and similar engineering improvements.

The extent of the engineering job to be done as a part of soil- and water-conservation operations on farm and ranch lands can be pointed up, perhaps, by citing the amount of some of them needed on a national basis: farm drainage, 45,000,000 acres; rehabilitation of outlet ditches serving cultivated, or partially cultivated, lands, 31,000,000 acres; community drainage work serving undeveloped lands, 18,000,000 acres; rehabilitation of irrigation works, 11,700,000 acres; outlet and farm water courses, 6,700,000 acres; soil saving dams, 405,000; terracing, 97,000,000 acres.

Perhaps it may serve to clarify the engineering aspects of soil and water conservation if we review briefly some of the more important practices requiring engineering knowledge in a few selected regions of the United States. Let us consider the Northeast, the Southeast, the southern Great Plains, and the Southwest.

Northeast

In New England and the nearby northeastern states the rainfall varies from 30 to 50 inches, and there is a growing season of about 130 days. The original vegetation was deciduous or mixed deciduous and coniferous forest, and much of the land is now forested.

Snow covers much of the area in the winter, when erosion is reduced. Spring is a period of floods and se-



◀ SOUTHERN GREAT PLAINS

This badly eroded Oklahoma farmyard, about 20 miles from the Guthrie Soil Conservation Camp, shows a combination of wind- and water-erosion which is not uncommon in the southern Great Plains portion of the United States. As much as 300,000,000 tons of soil were removed from this region during 1934 dust storms.

Soil Conservation Service

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NORTHWEST ▶

Representative of the Northwest is this 40-acre contour irrigated potato field in Fremont County, Idaho, on which effective soil conservation has been carried out. Dams are shortened by head ditches which intersect the field at appropriate distances. Plastic soils are used to irrigate the furrows.





A severe case of soil erosion, extending for about half a mile, occurs at Black River Falls, Wis. The view shown here looks down from the head of the gully. The extent of erosion may be estimated from the size of the man near the center of the illustration.

Soil Conservation Service

vere erosion. The time of land preparation and planting is the time of maximum exposure to erosion. Another period of erosion occurs in June and July when fields are bare and spring-sown grains afford but a minimum of vegetative protection. During the fall harvest of potatoes, and late truck crops, and during fall plowing for winter grain there is also a critical period. Primarily, erosion in the Northeast is sheet erosion, that is, more or less even removal of soil in thin layers over an entire segment of sloping land. It is the least conspicuous type of erosion, but its effects are nonetheless severe.

Among the needed soil- and water-conservation practices requiring engineering knowledge in this region is contour cultivation in place of the once prevalent up-and-downhill plowing and planting of croplands. Large diversion terraces across crop fields to dispose of excess water are a feature of northeastern soil conservation work. They are required to break the accumulated flow of water across long slopes. Orchards are laid out now on the contour. Contour furrows in pastures are required under some conditions. The building of ponds is likewise important, particularly as a part of pasture management. Water disposal systems for crop fields are valuable. In coastal areas especially, the development of drainage systems is a feature of the land treatment.

Southeast

The Appalachian Piedmont illustrates another broad type of natural area. Here the rainfall is 50 to 60 inches annually. The growing season is twice as long as in the Northeast. Although this country, like the Northeast, was once forested, most of it is now or has at one time been cultivated, three-fourths of which has been devoted to clean-tilled crops like cotton, corn, and tobacco. In this rolling, well-drained region, fields are often exposed to rains throughout the year, and erosion is severe. Gullies, some of them like miniature Grand Canyons, are common.

In this region, gully control has been a measure of rather widespread value. Contour cultivation is generally recommended, and with it extensive terrace systems, together with terrace outlets and grassed waterways to remove excess water. Strip cropping is of value in some places. Farm ponds are common.

Southern Great Plains

This highland area, with the Texas panhandle more or less as its center, is the famous Dust Bowl. The annual precipitation is less than 20 inches, and it is characterized by unpredictable variations, resulting in recurring dry periods, often several years in length. The original vegetation was grass — short or mid grasses much less luxuriant than the tall grasses of the prairies farther east. Here, as throughout the West, the soils are calcareous, in contrast to the acid soils of the humid East. Winds are high and often turbulent. Livestock and wheat are the principal land products. Although sheet and gully erosion occur, the most serious type of land damage is from wind erosion, so severe at times that 300,000,000 tons of soil were blown off the land in a single storm in May, 1934, to be carried across the eastern states, into the Atlantic Ocean.

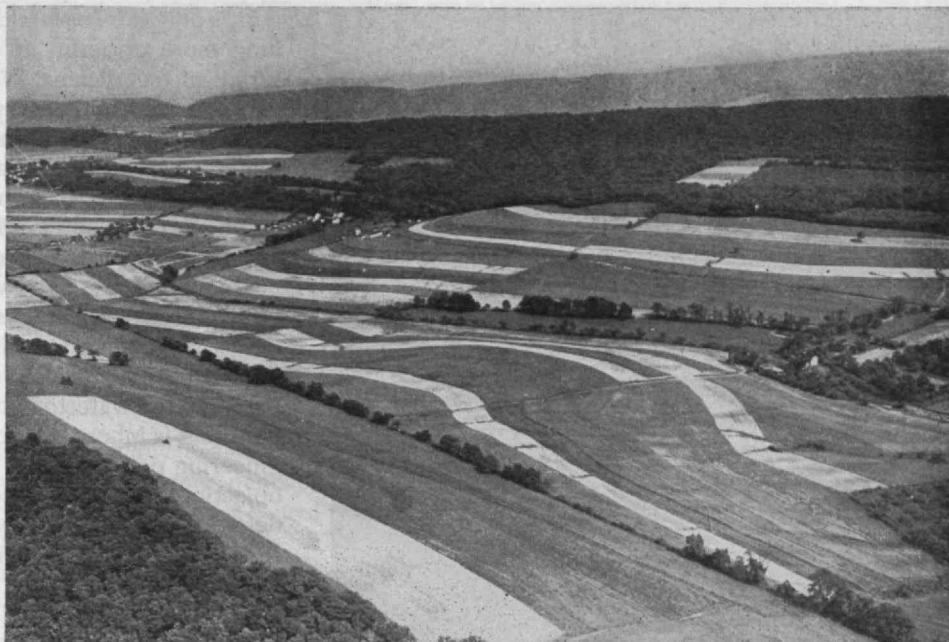
On cropland in this area, a special type of broad base terrace is used, not to carry water off the land as in the eastern humid areas, but to spread it and permit it to sink into the soil. These terraces may be 40 feet wide at the base with a very low crown. They follow the gentle contour of the land, may be miles long, and are usually closed at the ends. Strip cropping is used, primarily for wind erosion control. Contour cultivation and contour listing are practiced. On the pastured lands in the Plains, contour furrows are sometimes used, and ponds are frequently constructed.

Southwest

In the arid portions of Arizona, New Mexico, and adjacent states, the rainfall is nowhere more than 14 inches, except in the mountains, and in some parts of

Contour strip farming in Northumberland County, Stone Valley, Dalmatia, Pa., presents an interesting and striking view from the air, quite aside from the economic value to be gained by such soil conservation measures when applied to rolling country such as this.

Soil Conservation Service



these states precipitation may average only a couple of inches per year. These are desert areas, or at one time, before the white man came, they were perhaps desert grasslands. Grass is found now only in sheltered spots not accessible to grazing livestock. Water erosion is the cause of soil loss in much of this region. Silting of streams and sedimentation of reservoirs are serious. The Southwest has been livestock country, and soil conservation on depleted ranges is a tremendous problem.

In order to make the best use of existing forage, and to use the prevailing rainfall to its maximum, various land treatments requiring engineering knowledge on range lands have been utilized. Water spreading is such a practice. This may consist of small ditches that divert water from gully heads, or be a more complex system of channels to spread rainfall over extensive areas. Water retention structures of various types may be used in connection with such systems. Contour furrows are used as in other types of grazing land. Structures, some of them rather large ones, are frequently used to control head cutting of gullies.

Throughout the arid Southwest, as in many other sections of the United States west of the 100th meridian, river flood plains and river benches are now used extensively for the growing of cultivated crops. Cotton, alfalfa, fruit, truck, beets, grain, and a variety of other crops are grown in irrigated valleys of the West. Reclamation of western land for irrigation is a tremendous engineering task. The construction of water storage impoundments, some of them gigantic, river diversions, and main and lateral canals all require consummate engineering skill. When the water finally reaches the farm land itself it must be most carefully used, if soil and water conservation is to be achieved. Water must be carefully supplied to fields by appropriate channels, and gently deployed over the field itself. Ditches to provide the water and to carry away excess must be well engineered. To make the best use of water, most irrigated fields in the West

are now being leveled with the use of heavy equipment before a crop is grown.

Engineering as Part of Soil Conservation

In the above regional examples, only soil- and water-conservation practices that require engineering principles and knowledge for their correct design and application have been mentioned. These practices are only a part of the job. This point should be stressed, for soil conservation is a synthesis of sciences.

Wherever soil conservation is to be accomplished, there must first of all be a blueprint of land use prepared by a soil scientist and others. This consists of the land capability map of the operating unit of land, together with recommended treatments for each kind of land. The first requirement of a land operator who wishes to manage his land according to its physical capabilities, is to make sure that use of the land is in accordance with its capabilities. If it is not, then land-use conversions are required.

On crop fields, terraces and water disposal systems, however well designed, are worse than useless if they are applied to land that should not be cultivated. Land leveling and expensive irrigation systems are of no avail, no matter how well conceived, if they apply to soil that will not grow crops for an indefinite period of time. The same can be said of every other engineering practice useful in soil- and water-conservation work. It is useful only if it is applied, along with other practices, to land whose capability permits the kind of use the engineering practices are intended to support. The land use must first be right.

On most land best suited for crops, getting a cover of vegetation and incorporating more and more humus into the soil are of first importance. Thus it is that green manuring, cover crops, crop rotations, and crop residue management are soil conservation practices of primary value for cultivated land. In meadows and pastures the selection of the most appropriate grasses and legumes, correct seeding and fertilizing,



Soil Conservation Service

A good example of erosion of soil on pasture and range lands in Iowa, due to overgrazing, is illustrated here.

together with rotation and deferred grazing, are important. On range land of the West and in wood lots, too, there are many special practices that contribute to the best use of each type of land at the same time that erosion is controlled and the soil preserved. There are more than 50 specific soil- and water-conservation practices. With each of the types of land use the engineer can contribute immeasurably. The land, in fact, cannot be well managed without his specialized knowledge and techniques. But the engineer is just one of a team. It is only when he works with the soil scientist, agronomist, forester, biologist, range manager, and other land technicians that he can make his greatest contribution to soil conservation.

Working with Nature

A simple example will serve to illustrate. In the early days of soil conservation work, terrace outlet channels were frequently designed to include a series of masonry drop structures. These were not only expensive, they often interfered with the use of farm machinery. Working with the agronomist and soil scientist, the engineer learned after awhile that certain kinds of grasses could be successfully seeded on terrace outlets. If the outlet was constructed a year or two before water from the terraces was discharged into it, the grasses had time to form a thick sod. Then when water from the terraces did flow down the outlet, structures were often unnecessary, if permissible velocities were not exceeded. In the Soil Conservation Service it is not unusual to hear engineers talking about *Poa pratensis* or *Bromus inermis* as if their training had been in agronomy where the Latin names of plants are tools of the trade. Conversely, other technicians have picked up some of the simple engineering tricks of the trade.

It is only fair to state that conservationists probably fling more criticism at engineers than at any other group of technicians. Whether these conservationists are interested in forests, grazing lands, wild life, water pollution control, soil conservation, or some other particular phase of conservation, there is often expressed the idea that there is something incompatible between engineers and conservationists.

This attitude is especially directed against engineers who design large water impoundments that are often publicized as conservation projects. Conservationists are quick to point out that huge dams often flood great acreages of valuable agricultural land, destroy unique waterfowl habitat, or are built to irrigate land that is inherently poor for cultivation. Where engineering projects drain swamps and marshlands, the objection has been frequently heard that such activity destroys natural conditions for muskrats and waterfowl worth more per acre than any other product of such land. It is no secret that in the United States we have, during our short history, drained much wet land that was not fit for cultivated crops after the drainage was completed. Stream straightening, water-course diversion, and other engineering activities have drawn the fire of conservationists at times.

Like most generalizations, of course, it is foolish to think of engineers *versus* conservationists. Many engineers are top-notch conservationists. Our discussion points up once more, however, the necessity of looking at the whole job to be done. In the past, many engineering works have been considered to be conquests of nature. In conservation work at least, where we are dealing with soil, water, and the other components of our natural environment, we do not conquer nature, we learn to work with her. Even such an engineering achievement as Hoover Dam is less striking if, as Colonel Claude H. Birdseye predicts, it will be filled with silt in 144 years.

One of the fundamental laws of nature is that all parts of the environment are related. An engineer would not design a dam, or bridge, or tower, without relating all members of the structure to each other, or without considering it in relation to the earth upon which it is to stand, or without weighing its appearance against its purpose. It is but an extension of this type of reasoning to a fuller understanding of the natural world in which we live.

Permit me to cite an example of interrelationships in nature from my own field of biology. A farmer once complained that he no longer had ducks on his pond. A biologist determined that there were ducks no more because the skunks were being trapped. This seemed a poor explanation until the biologist explained that skunks dig snapping turtle eggs out of the sand where they are laid, and eat them. When the skunks were trapped, the turtles multiplied until their food became scarce. Then the turtles began to feed on ducklings. The ducks would not nest where they were thus molested, and they left. Thus the relationship between the ducks and the skunks. This story is often used as an example of ecological thinking, that is, thinking not so much in strict terms of cause and effect, but in terms of interrelationships.

(Continued on page 304)

THRUST PROBLEMS IN Damaged Arch Bridges

The Experience of Army Engineers

in Repairing War-Damaged European Bridges

Emphasizes Some Novel Methods of Reconstruction

By WERNER H. GUMPERTZ

MULTIPLE arch bridges are usually designed in such a way that the horizontal components of the arch thrusts of two adjoining arches cancel each other at the piers. Thus, the piers have to absorb only the resulting vertical forces, or forces very close to the vertical in case of unequal arch spans. The wholesale destruction of European bridges during World War II has given engineers an opportunity to observe the effects of horizontal arch thrust, when the balance of the bridge has been disturbed by the destruction of one or more arches. The observation of the remaining arches has led to further studies regarding the solution of the thrust problem in varying local conditions. Certain experiences with combined masonry and steel structures in the mountains of Switzerland and Austria have shown how these problems were solved in the period after World War I.

Results of the blasting of one or more spans of multiple arch bridges have been manifold, according to the particular design. Reinforced concrete structures have usually fared best, since they have a great reserve strength, and, to some extent, can absorb the change from compression to tension in certain essential sections. If, for example, the center span of a multiple reinforced concrete arch bridge has been destroyed, the arch thrust in the last remaining arch will exert a horizontal force on the head of the last pier. This force will be counteracted by the tensile strength of the steel in the arch crown. In case of a masonry or plain concrete structure there is no steel in the crown, and the tensile strength of the arch is therefore very small. In both cases it must be assumed of course that the arches are fixed. As the horizontal force increases,

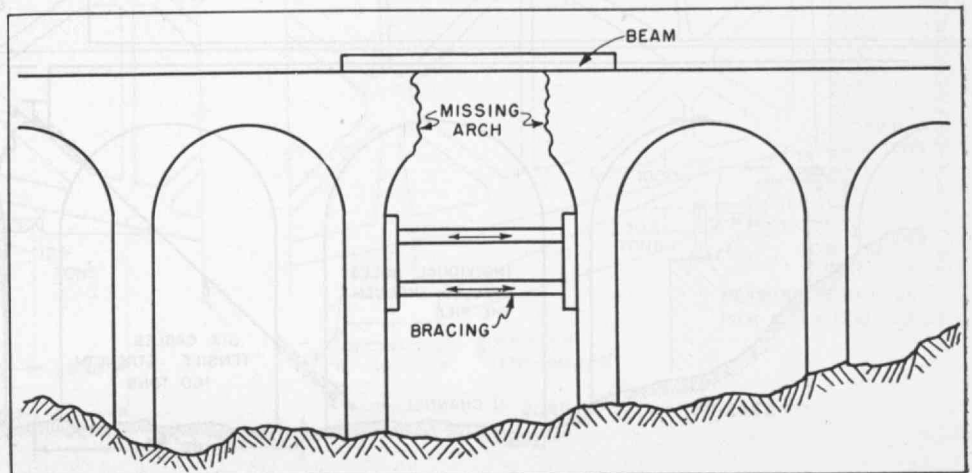
it will materially affect the pier that, by virtue of the blasting, has now become the last standing pier. The resultant force in that pier, which before had safely been absorbed by the pier foundation, will be deflected toward the gap. Once the small cohesive force between the pier and its foundation is overcome, the pier will inevitably collapse, causing one or several adjoining arches to collapse with it.

Experience has shown that some plain concrete and masonry arches, usually with half-circular intrados, have retained a precarious balance without collapsing. It should be borne in mind, however, that concrete and masonry arches never quite stop "working," and the influence of plastic flow is now generally recognized. In many cases the complete collapse of the bridge can be prevented, therefore, by prompt action in counteracting the one-sided arch thrust. A number of countermeasures have been taken, adapted to the particular local conditions to insure the preservation of partly destroyed bridges. In the following, a few of these measures will be shortly discussed.

A viaduct with small spans, only one of which has been destroyed, is shown in Fig. 1. The simple and effective emergency repair, in which the two piers are braced against each other, creates a safe bridge, for the thrusts from both sides are balanced. The flow of forces in the piers was not materially changed. A simple beam across the top carried the traffic. No further action was required until such time as permanent repairs could be made.

An article in the *Engineering News-Record*¹ describes how one arch of a demolished Italian viaduct was closed by erection of a filling wall which counter-

Fig. 1. In those cases in which a single arch has been destroyed, emergency bracing in the arch opening, with beams above the break, provides effective temporary reconstruction.



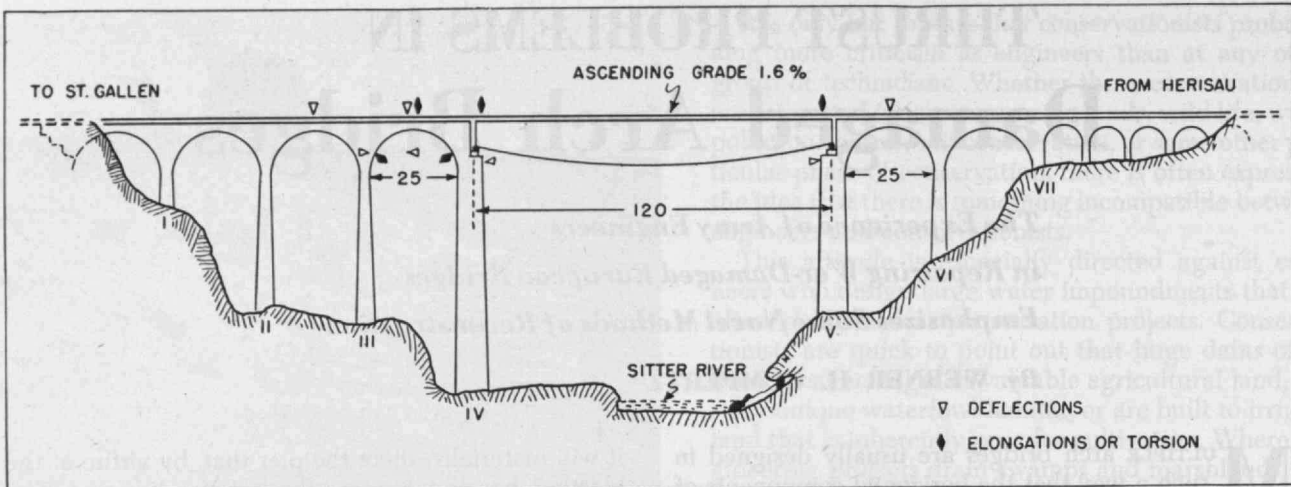


Fig. 2. Diagram of arched bridge between St. Gallen and Herisau, Switzerland, before damage of central arches. The great height of Pier IV, more than 300 feet, made repair a difficult task. All dimensions are in meters. Positions of tensiometers are indicated in the diagram.

acted the pressure from an adjoining earth embankment. To prevent arch thrust, a similar solution has been proposed by Mr. Bleich in *Schweizerische Bauzeitung*² (Zurich, Switzerland). In this case, the viaduct had not been destroyed by blasting. It consisted of a steel center section and masonry arch approaches as shown in Fig. 2. Since the steel span was supported as a simple beam, it contributed nothing to the bracing of the two masonry approaches. The one-sided thrust soon showed itself in the deflection of the masonry pier heads. The bearings of the steel span had to be readjusted because the two end piers were being deflected towards the gap. Shortly before World War I, the deflection had become so great that deci-

sive measures had to be taken, and it was proposed to fill the two end arches with masonry, thus creating a stable base which could absorb the one-sided thrust. War events intervened, and the subsequent electrification of the railroad line crossing the viaduct made it necessary to build a new structure. However, an important lesson was learned, and from then on no important bridge was built with two different basic materials, that is, masonry (or concrete) and steel.

The Castle Muir Bridge in Switzerland crosses a mountain stream on several small arches. When a flash flood washed out one of the river piers, the two adjoining arches collapsed. They were replaced by erection of a single reinforced concrete arch. The new

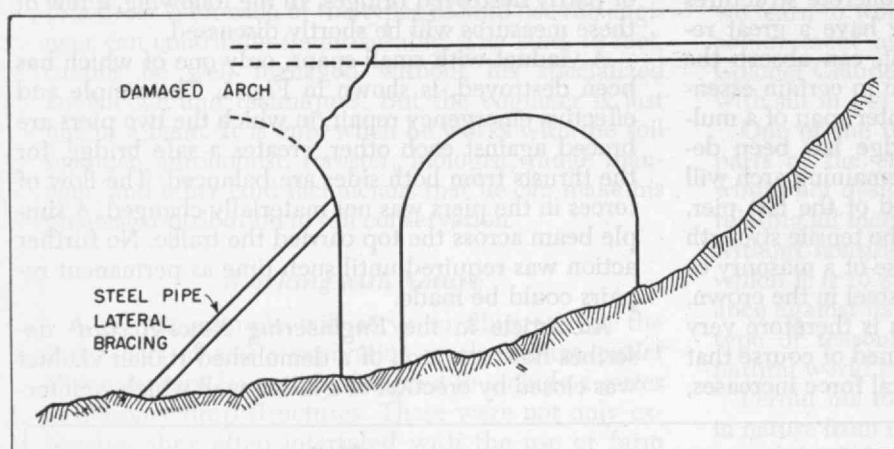


Fig. 3. East end of Kaempfelbach viaduct, after war damage, is braced with four parallel steel pipes whose purpose is to conduct side thrust on remaining arch safely to ground, as shown at left.

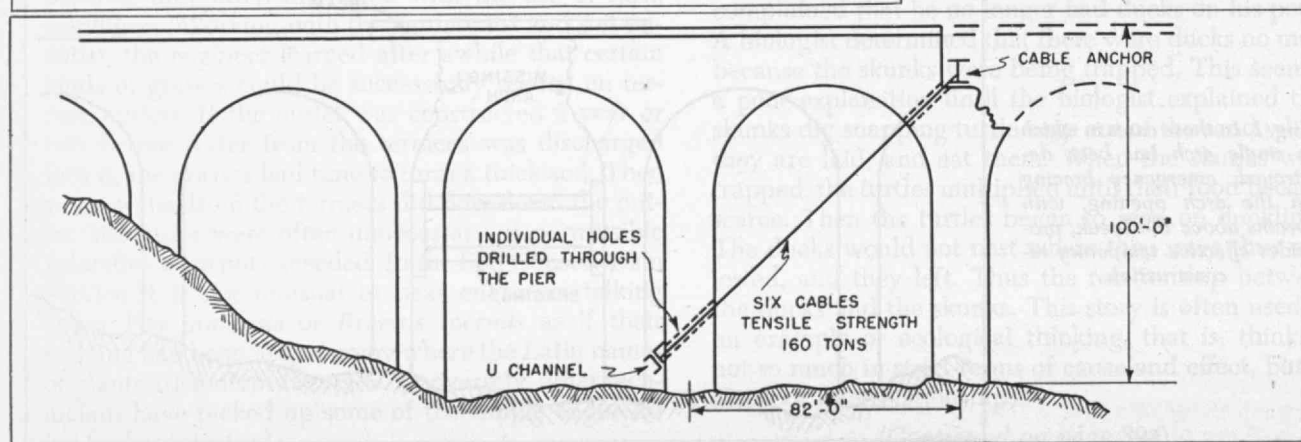


Fig. 4. Sketch (below) of the "tie-back" arrangement at the west end of the Kaempfelbach viaduct. The unbalanced side thrust of the last pier, which has not been destroyed, is anchored by the six cables connecting the cable anchor with the U-channel.

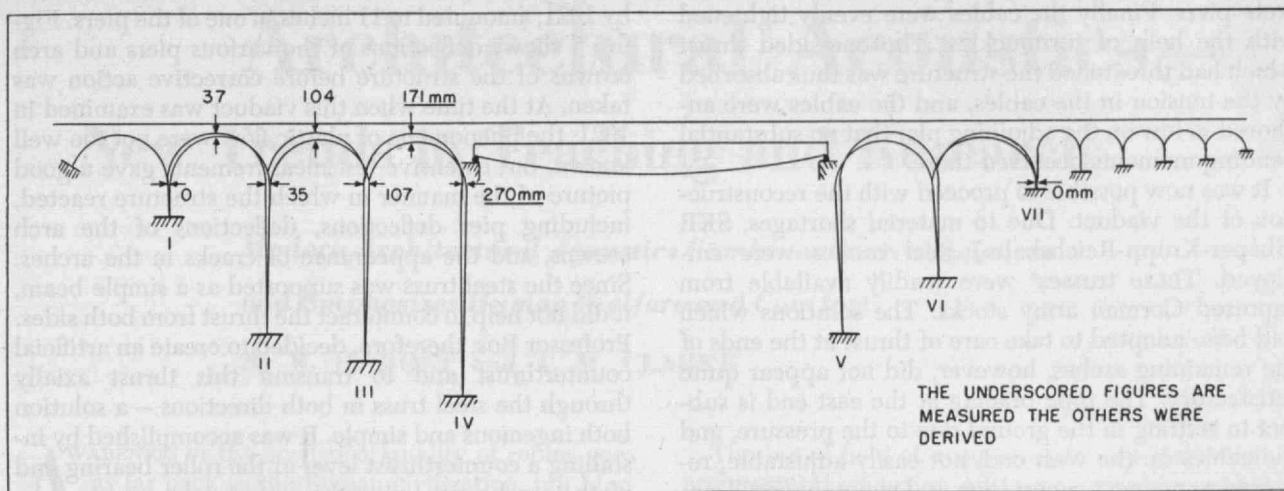


Fig. 5. Diagram showing the positions of the piers before and after war damage of the Swiss viaduct between St. Gallen and Herisau. The deflections of the pier and arch crown are given here in millimeters. The original position of the arches is shown for purposes of comparison.

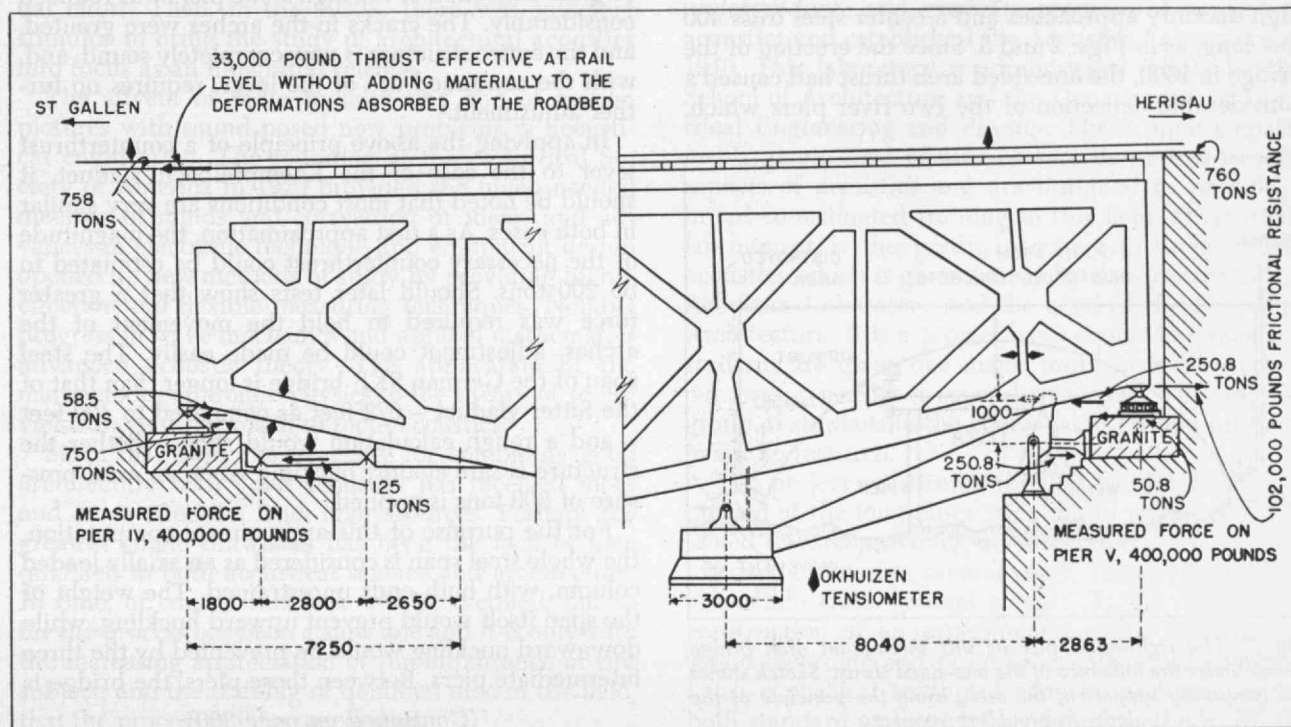
span absorbed the thrust from both sides, and no further difficulty was encountered with this bridge.

Two interesting semipermanent solutions were found in the reconstruction of the partially destroyed Kaempfelbach viaduct near Pforzheim, Germany, on the superhighway between Frankfurt and Munich. Eight of the 13 concrete arches had been demolished by retreating German forces. The length of the gap was 672 feet, and the roadway was up to 190 feet above the bottom of the valley. The east end of the viaduct as shown in Fig. 3 was not too high, so that the lever action of the thrust was not excessively great. Structural steel pipe of heavy cross section was employed as lateral bracing, being placed against the pier at about half height, and resting on the ground at an angle of 45 degrees. Any one-sided thrust could

thus safely be conducted through the pipe to ground, without causing the pier to tip over.

Most of the piers on the west side were much higher — about 100 feet — and braces could not be employed. Therefore it was decided to anchor this pier with the help of steel cables to the next adjoining pier, as shown in Fig. 4. An I beam was placed across the width of the pier as a cable anchor, and the pier itself was pierced by six accurately drilled holes. Steel cables of 165 tons tensile strength each were carried through the holes and anchored to the I beam at even distances. Similar holes were drilled near the bottom of the next adjoining pier, and the cables were similarly anchored in a U-channel leaning on the back of that pier. These holes were drilled with great precision to avoid any contact between the cables and the con-

Fig. 6. Both ends of the steel truss of the St. Gallen-Herisau viaduct are shown with the counterthrust lever in place. Note the special bearings to transmit the thrust force horizontally. Measurements are given in millimeters.



crete piers. Finally the cables were evenly tightened with the help of turnbuckles. The one-sided thrust which had threatened the structure was thus absorbed by the tension in the cables, and the cables were anchored so low on the adjoining pier that no substantial bending moments occurred there.

It was now possible to proceed with the reconstruction of the viaduct. Due to material shortages, SKR (Shaper-Krupp-Reichsbahn) steel trusses were employed. These trusses⁹ were readily available from captured German army stocks. The solutions which had been adopted to take care of thrust at the ends of the remaining arches, however, did not appear quite satisfactory. The pipe bracing at the east end is subject to settling in the ground due to the pressure, and the cables on the west end, not easily adjustable, required permanent supervision and maintenance. Temperature changes might cause such variations in cable length as to give the I beam on top of the pier considerable leeway, thus causing plastic flow in the concrete arch, so that the stability of the structure might again be endangered. There was also some danger of possible serious damage due to tampering with the easily accessible cables.

Past experience with a problem of such special nature is, of course, very limited. No similar case in American bridge engineering could be found by the writer of this article. However, Swiss engineers had been faced with a problem almost identical with that of the Austrian viaduct described above. The solution appeared to be so interesting and applicable in this case that it will be described below as a possible final measure to secure the concrete structure of the Kaempfelbach Bridge.

Reference is made to two articles in the *Schweizerische Bauzeitung*.⁴ In the second article, Professor M. Roš of the Swiss Federal Institute of Technology in Zurich describes the Sitter River viaduct of the Bodensee-Toggenburg railroad in Switzerland. As in the case of the Austrian bridge, this viaduct consists of high masonry approaches and a center steel truss 400 feet long, as in Figs. 2 and 5. Since the erection of the bridge in 1909, the one-sided arch thrust had caused a considerable deflection of the two river piers which,

by 1921, amounted to 11 inches in one of the piers. Figure 5 shows deflections of the various piers and arch crowns of the structure before corrective action was taken. At the time when this viaduct was examined in 1921, the phenomena of plastic flow were not too well known, but extensive test measurements gave a good picture of the manner in which the structure reacted, including pier deflections, deflections of the arch crowns, and the appearance of cracks in the arches. Since the steel truss was supported as a simple beam, it did not help to counteract the thrust from both sides. Professor Roš, therefore, decided to create an artificial counterthrust and to transmit this thrust axially through the steel truss in both directions — a solution both ingenious and simple. It was accomplished by installing a counterthrust lever at the roller bearing end of the steel span, using the common lever principle.

As shown in Fig. 6, the free arm of the lever was weighted down by a steel weight, and the other arm had two stiffly connected levers, one of which rested against the arch structure, the other lever transmitting the counterthrust into the steel truss and eventually through the rails and a special horizontal bearing into the other end of the masonry arch structure. As the weighted arm of the lever was freely suspended, any change in the length of the steel truss could be absorbed by a slight upward or downward movement of this arm. No change in the magnitude of the horizontal counterthrust would be caused by this motion. Temperature changes, traffic and impact loads, as well as changes in the length of the steel truss could thus be absorbed. No adjustment was necessary, and the lever was far removed from any possible interference.

The counterthrust was initially set at 250 tons. An increase or decrease could be effected by adding or removing weight from the free arm of the counterthrust lever. Actually, the thrust force of 250 tons proved to be of proper magnitude, and in the year following the installation of the counterthrust lever, the original deflection of the high stone piers was reduced considerably. The cracks in the arches were grouted, and the entire structure is now completely sound, and, with the continued use of the lever, requires no further adjustment.

In applying the above principle of a counterthrust lever to the case of the Kaempfelbach viaduct, it should be noted that most conditions are very similar in both cases. As a first approximation, the magnitude of the necessary counterthrust could be estimated to be 200 tons. Should later tests show that a greater force was required to hold the movement of the arches, adjustment could be made easily. The steel span of the German SKR bridge is longer than that of the Sitter viaduct — 672 feet as compared to 400 feet — and a rough calculation would show whether the structure is safe against buckling when an axial pressure of 200 tons is applied.

For the purpose of this approximate computation, the whole steel span is considered as an axially loaded column, with both ends unrestrained. The weight of the span itself would prevent upward buckling, while downward buckling would be prevented by the three intermediate piers. Between these piers, the bridge is

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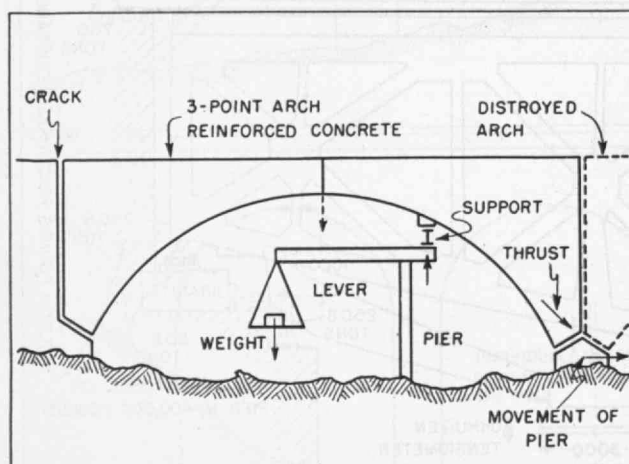


Fig. 7. The right-hand pier of this three-point arch bridge moves under the influence of the one-sided thrust. Sketch shows the temporary support of the arch, using the principle of the lever in providing support.

Architectural Acoustics— New Trends in Teaching and Research

Modern Architectural Acoustics Combines Several Sciences and Emphasizes Human Welfare and Comfort

By R. H. BOLT and A. M. CLARKE

AWARENESS of the acoustical quality of rooms goes as far back as the Roman civilization, but literally nothing was attempted in the way of designing rooms that were acoustically good until the turn of the Twentieth Century. Throughout the intervening centuries, attention was paid to this problem, but the emphasis was placed primarily on advancing the theory of sound rather than on developing and applying acoustic principles for more effective and comfortable appreciation of sound. About half a century ago, the late Professor Wallace C. Sabine, of Harvard University, was the first to make a concerted effort to find the reason why one room was acoustically better than another. By means of innumerable painstaking experiments, he arrived at an approximate analysis of the reverberation of sound in rooms, that is, the repeated "echoing" of sound from room walls with decreasing intensity until quiet is reached. Sabine's formula for reverberation time—the time for the sound intensity level to decay to 10^{-6} of its steady value—was empirically developed, but his results were subsequently substantiated by theoretical considerations, and formed a stepping stone to present-day room acoustics. Research continued to be sporadic, however, and for the most part was carried on by individual effort. Then, in the 1920's, there was sufficient stimulus to bring the study of architectural acoustics into focus as an integrated science.

The advent of radio broadcasting and of motion pictures with sound posed new problems in acoustical engineering. The founding of the Acoustical Society of America in 1929 provided the much needed meeting of minds and correlation of ideas; and advances in electronic technique and equipment design opened up new methods of study by providing highly effective and flexible measuring techniques. Notable progress in wave mechanics and applied mathematics advanced acoustic theory. The application of the mathematics of atomic physics to the theory of sound yielded a new approach to room acoustics.

Since that time, the necessity for combining good architecture with good acoustics has received more and more attention from many sources. Perhaps the greatest single drawback has been the lack of men qualified in both acoustical science and architecture. In time, of course, this lack will be rectified, but so far the process has been a slow one and it is only with the increasing appreciation of the importance of this subject, and the training of qualified men in the field, that the process will be speeded up.

The broad field of acoustics, and especially that of architectural acoustics, offers a particularly rich and fertile field for the advancement of research and teaching methods, and the further development of the mature student to meet the needs of modern society. First of all, the student's interest and enthusiasm may be easily aroused, for the field of applied acoustics is a comparatively new one. Much fundamental work still remains to be done in it, so that those now entering this field, or those already engaged in it, have the prospect of doing pioneering and fundamental work. This appears to be particularly true in the engineering rather than the pure science aspects of the subject. In its applications, architectural acoustics offers many opportunities for promoting human comfort and welfare. The student and research worker are brought into direct contact with such subjects as architecture, mathematical physics, engineering, economics, psychology, and are concerned with aesthetic and cultural problems which usually are not brought out quite so significantly in other branches of engineering.

Recognizing the opportunity for carrying on useful research, and for conducting pioneering educational methods in this important field, M.I.T. expanded its undergraduate and graduate program of courses in acoustics and established the Acoustics Laboratory in 1946. This laboratory is administered jointly by the School of Architecture and the Departments of Electrical Engineering and Physics. These three Departments give a total of nine courses that cover various aspects of acoustics and are designed to provide a broad co-ordinated training in this field. Of particular interest is the graduate course in architectural acoustics which is given jointly by the director of the Acoustics Laboratory and the head of the School of Architecture. It is a project-basis course in which the students are given one major problem to be worked out over a period of several semesters. The original group of students in the course were given a problem in studio research.

This project constituted the first and implementing portion of the long-range program in room acoustics, aimed toward providing an integrated study extending over a period of several years. The program is divided into three general stages: (1) the design and construction of an experimental studio suitable for sound recording and radio broadcasting; (2) comprehensive physical testing of acoustic performance by both standard and newly developed methods; (3) in-



The control room is separated from the acoustic chamber by a double-pane window which enables operators to have visual contact but aural isolation from events in the studio.

vestigation of speech articulation, listener reaction, and other subjective aspects of room acoustics. The studio development provided an adequate means of carrying out the program since it illustrates most of the problems of room acoustics, and, in addition, it facilitates a wide range of tests and has a basic practical value.

Both the program and the student project were in the nature of an educational experiment, since they offered not only something comparatively new to students but also called for integration of several points of view and sustained co-operation on the part of several academic departments. Eight graduate students from various parts of the country were originally enrolled in the architectural acoustics course. The problem assigned was, in part, as follows: "In line with the long range planning for the Institute, it is desirable to explore new possibilities in the design of studios for recording and broadcasting. It is the purpose of this problem to design a studio which can be erected during the spring term. This studio would then be subjected to a wide variety of acoustical measure-

ments and performance tests as part of the general research program."

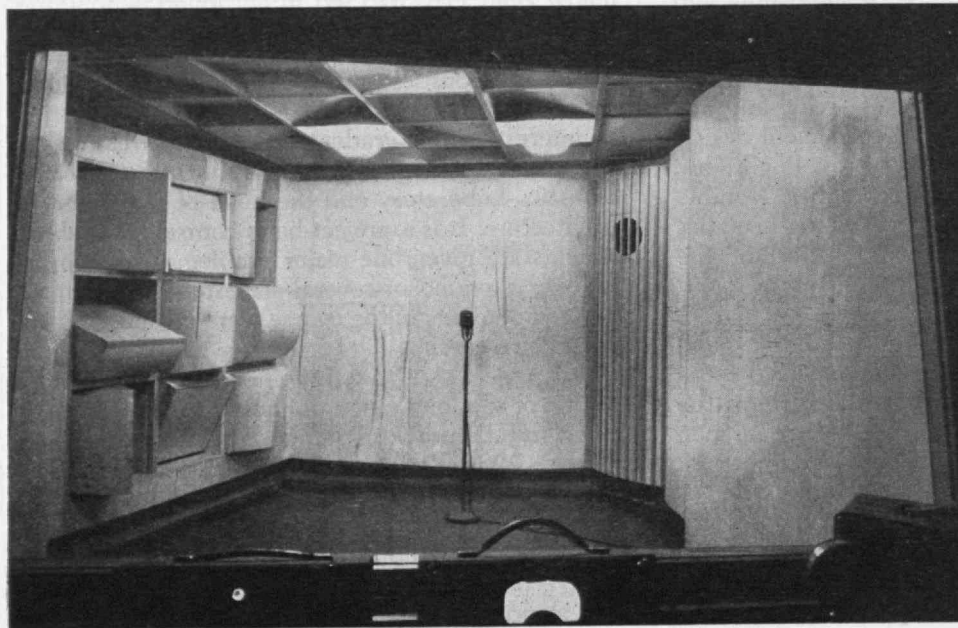
After a review in the fundamentals of sound, trends in applied design of studios were studied. Several class members then produced original designs and small scale models of proposed studios. On the whole these showed good planning, and presented some interesting new contributions of interior design and acoustic engineering. The design selected for full-scale construction was a composite of the best work of the group as a whole, and this was reduced to detailed working drawings by the students. The students had the considerable advantage of seeing their ideas put into concrete form. By actually supervising the construction they were made conscious of the importance of acoustical quality as a fundamental element in the design of any room.

The requisites for a room or studio that is acoustically good can be predetermined up to a certain point with but a fair amount of exactness. General empirical knowledge and proven mathematical theory supply a good deal of the basic groundwork, as indeed they should. As yet, however, acoustical engineering has not attained the degree of precision and reliability which characterizes most fields of engineering; it is hoped that the work now in progress can make a contribution in putting architectural acoustics on a firmer engineering basis.

Objective Measurements of Studio Performance

The second step in the comprehensive program now under way is the determination of the physical properties of the studio and the correlation of its measured properties with those ascertained by existing theory and empirical knowledge. Since no two rooms are exactly alike, it would, of course, be expected that the results of measurements made on a single studio would be of limited value in developing a broad, comprehensive understanding of acoustical engineering principles. To a certain extent this is true. At the same time, it is possible to obtain a vast amount of

(Continued on page 292)



The view from the control-room window illustrates the unusual construction of the studio which provides the flexibility required by research. The semicylinders at the left may be turned to present flat or rounded surfaces with axes alternately vertical and horizontal. The ceiling is divided into cells, each with its slope different from that of adjacent cells. At the right, the walls are curved, in further attempt to provide sound diffusion and minimize standing waves. All wall surfaces and ceiling sections are demountable, replaceable units. Sound may be introduced by the loud speaker shown as the dark circle beyond the vertical grill.

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Inauguration of James Rhyne Killian, Jr. as the Institute's Tenth President to Culminate Cambridge Celebration

CULMINATING an international mid-century convocation on the social implications of scientific progress to be held at M.I.T. on March 31 and April 1, will be the inauguration of Dr. James R. Killian, Jr., '26, on April 2 as the Institute's tenth president. President Harry S. Truman and the Right Honorable Winston Churchill, both of whom will deliver addresses, will be among the group of distinguished statesmen, educators, and scientists coming to Cambridge from all over the world to participate in the convocation and inauguration. Those who have already accepted invitations to take part in the convocation panel discussions are listed in the table below.

The convocation will open on the afternoon of Thursday, March 31, with an address by Professor John E. Burchard, '23, Dean of Humanities at M.I.T. and chairman of the convocation; and Dr. Karl T. Compton, chairman of the M.I.T. Corporation and chairman of the Research and Development Board of the National Military Establishment, will sound the keynote of the convocation in an address on "The State of Science."

In the evening, Mr. Churchill will deliver an address on the general theme of progress realized during the Twentieth Century. On Friday, April 1, the second day of the convocation, there will be six panel discussions, the first of which will consider "Men against Nature . . . The Problem of World Production." This will be the first of two panels on material questions; and the second, on Friday afternoon, will

consider "Men against Men . . . The Problem of the Underdeveloped Area." There will be two panels on spiritual questions: the first "Science, Materialism, and the Human Spirit"; and the second "The Role of the Individual in a World of Institutions."

Intellectual questions will be covered in two further panels, the first of which will consider "Specialization in Twentieth Century Education," and the second, "The State, Industry, and the University."

President Truman will deliver his address on Friday evening, April 1. It is hoped he will deal with the contributions which science and technology can be expected to make to the nation's welfare.

The ceremonies at which Dr. Killian will be inaugurated will be held in the new Rockwell Cage at the Institute at 11:00 A.M., Saturday, April 2. Dr. Compton, whom the new president will succeed, will introduce Dr. Killian and invest him with the authority of his office as tenth president of M.I.T. The academic delegates and Harvard University will be represented by James Bryant Conant, President of the University, who will make an address at the inauguration ceremonies. John T. Toohy, President of the M.I.T. Class of 1949, will address the new president in behalf of the Institute's student body, and the Alumni will be represented in an address by David A. Shepard of London, a member of the Class of 1926 with which Dr. Killian was graduated. The Faculty will be represented by George R. Harrison, Dean of Science, whose address will close the inauguration ceremonies.

INVITED GUESTS WHO WILL PARTICIPATE IN CONVOCATION PROGRAM

OSWALDO ARANHA — formerly, Brazilian Ambassador to United States
JAMES M. BARKER, '07 — Chairman of Board, Allstate Insurance Company
LATROD BELL — Vice-Chairman of the Board of Trustees, University of Chicago; Chairman of the Board of Trustees, Carleton College
RICHARD M. BISSELL, JR. — Professor of Economics, M.I.T., on leave as Assistant Deputy Administrator, Economic Co-operation Administration
JULIUS SEELYE BIXLER — President, Colby College
PERCY W. BRIDGMAN — Hollis Professor of Mathematics and Natural Science, Harvard University; Nobel Prize in Physics
VANNEVAR BUSH, '16 — President, Carnegie Institution of Washington
ERWIN D. CANHAM — Editor, *The Christian Science Monitor*; President, American Society of Newspaper Editors
CARLOS CONTRERAS — Architect, Mexico City; President, National Planning Association of Mexico
LEE A. DUBRIDGE — President, California Institute of Technology
RALPH E. FLANDERS — United States Senator from Vermont
CLINTON S. GOLDEN — formerly, Vice-Chairman, War Production Board, War Manpower Commission; now, Labor Adviser, Economic Co-operation Administration
WILLIAM MALCOLM HAILEY — Baron of Shahpur in the Punjab and Newport Magnell in Buckinghamshire; Member, House of Lords
SIDNEY HOOK — Chairman, Department of Philosophy, New York University
BRYN J. HOVDE — President, The New School for Social Research
FREDERIC LILGE — Assistant Professor of Education, the University of California; author, *The Abuse of Learning*
SIR RICHARD LIVINGSTON — formerly, Vice-Chancellor of Oxford; now, President, Corpus Christi College, Oxford
JACQUES MARITAIN — formerly, French Ambassador to the Vatican; Professor of Philosophy, Princeton University

SIR RAMASWAMI MUDALIAR — President, United Nations Economic and Social Council, Prime Minister of Mysore State, India
FRANK W. NOTESTEIN — Professor of Demography, Princeton University and Director of Office of Population Research in the Woodrow Wilson School of Public and International Affairs
PETER H. OEGARD — Chairman, Department of Political Science, University of California
FAIRFIELD OSBORN — President, the New York Zoological Society; author "Our Plundered Planet"
ANDREW A. POTTER, '03 — Dean of the Schools of Engineering and Director of the Engineering Experiment Station, Purdue University
NELSON A. ROCKEFELLER — President, American International Association for Economic and Social Development; President, International Basic Economy Corporation; one-time Assistant Secretary of State
PHILLIP J. RULON — Professor of Education, Harvard University
JOHN DALE RUSSELL — formerly, Professor of Education, University of Chicago; Director, Division of Higher Education, United States Office of Education
ROBERT P. RUSSELL, '22 — with International Basic Economy Corporation in Venezuela
PIERRE RYCKMANS — formerly, Governor General of the Belgian Congo; now, Belgian representative on the Trusteeship Council, United Nations
WALTER T. STACE — Stuart Professor of Philosophy, Princeton University
CHARLES A. THOMAS, '24 — Executive Vice-president, Monsanto Chemical Company
SIR HENRY TIZARD — formerly, President Magdalen College, Oxford; Chairman, Defence Research Policy Committee of the Ministry of Defence, United Kingdom
MERLE A. TUVE — Director, Department of Terrestrial Magnetism, Carnegie Institution of Washington

Supersonic Tunnel

JOHN A. LUNN, '17, Vice-president, presided at the 266th meeting of the Alumni Council in the Graduate House on January 31, in the unavoidable absence of C. George Dandrow, '22, President. In spite of inclement weather, 67 members and guests were in attendance. During the business portion of the meeting it was announced that nine members of the Institute's staff visited 17 M.I.T. clubs from Worcester to San Francisco during December and January; that the number of contributors to the Alumni Fund is running ahead of that for the corresponding period last year, but is lagging in amount. Nominees for election by the Alumni Association, as recorded in the following columns, were also announced, as were the chairmen of committees for Alumni Day, 1949.

Everett M. Baker, Dean of Students, summarized plans for the presidential inauguration of Dr. Killian in the Rockwell Athletic Cage on April 2. Housing of guests is likely to present a problem during the inauguration and convocation ceremonies, and it is anticipated that the new Senior House will be used to alleviate any overcrowded conditions which may arise. The inauguration will climax a three-day celebration at the Institute, of which the first two days will be devoted to a discussion of the social implications of modern science.

Mr. Lunn then introduced Professor John R. Markham, '18, of the Aeronautical Engineering Department, and Director of the Institute's supersonic wind tunnel which is nearing completion in a new building on M.I.T. property west of the main buildings and near the Cottage Farm Bridge. With the aid of slides, Professor Markham discussed the design of supersonic tunnels in which wind velocities exceeding the speed of propagation of sound are produced for modern aeronautical research. Particular emphasis was given to the problems of producing wind velocities of

several hundred miles per hour, cooling of the tunnel, minimizing sound and vibration, eliminating moisture in the tunnel, supporting models within the tunnel, and of making measurements by mechanical and photographic methods.

Democracy's Prerogative

MARCH is the month in which ballots go to M.I.T. Alumni for their annual election of officers and representatives of the Institute's 40,000 Alumni. C. Adrian Sawyer, Jr., '02, III, President of the Sawyer Construction Company, has been nominated for the presidency of the M.I.T. Alumni Association for the year beginning July 1, 1949.

The Association's National Nominating Committee — with Robert S. Williams, '02, chairman, Ralph C. Robinson, '01, Gordon G. Holbrook, '10, Jonathan A. Noyes, '12, Robert C. Erb, '17, Minot R. Edwards, '22, John S. Williams, Jr., '22, Henry C. Gunning, '26, Thomas G. Harvey, '28, and Stephen L. Macdonald, '39 — has also nominated for election to the vice-presidency for a two-year term Horatio L. Bond, '23, XV, chief engineer, National Fire Protection Association, Boston. Philip E. Morrill, '14, I, Vice-president and Director, Bemis Bro. Bag Company, Boston, and Parke D. Appel, '22, VI, general personnel assistant, New England Tel. and Tel. Company, Boston, have been nominated to serve on the M.I.T. Alumni Association's Executive Committee for terms of two years each, beginning July 1, 1949.

Nominated for alumni term membership on the M.I.T. Corporation for five-year terms are: Robert T. Haslam, '11, X, Vice-president and Director, Standard Oil Company (N.J.), and Director and member of the executive committee of the Ethyl Corporation; Rudolf F. Haffenreffer, '95, chairman of the board, Narragansett Brewing Company; and George J. Leness, '26, I, partner of Merrill Lynch, Pierce, Fenner and

TO THE PRESIDENCY

... of the Alumni Association, C. Adrian Sawyer, Jr., '02, has been nominated for election for the coming year. Following his graduation from the Institute, Mr. Sawyer was an assistant in the Department of Mining Engineering for a year. He was with Andrew D. Fuller Company from 1903 to 1907, and the George A. Fuller Company from 1908 to 1918, being vice-president of the latter firm in 1917-1918. For the next six years Mr. Sawyer was with the Howes Brothers Company, and in 1924 formed the Sawyer Construction Company of which he is president. In his professional capacity, Mr. Sawyer has been responsible for the construction of many large educational and medical units, including Building 24 (used by the Radiation Laboratory during World War II) and the Sloan



Automotive Laboratory at M.I.T. He is chairman of the Newton Board of Appeal, president of the New England Peabody Home for Crippled Children, director of the Suffolk First Federal and Loan Association, and president of the Brae Burn Country Club. He is president of the Hahnemann Hospital and was formerly trustee of the New England Deaconess and Newton-Wellesley hospitals, and commodore of the Boston Yacht Club. He will come to his new post with a rich background of service to M.I.T., having been a member of the Alumni Advisory Council on Athletics in 1918-1919; a member of the Executive Committee of the Alumni Association, 1932-1934; vice-president of the Alumni Association, 1935-1937; and a member of the Alumni Council from 1932-1944.



George J. Leness, '26

partner, Merrill Lynch, Pierce, Fenner and Beane, New York, in charge of that firm's underwriting activities; during recent years, governor, National Association of Security Dealers, New York section; vice-chairman, New York Group of Investment Bankers Association; President, the Bond Club of New York.

Robert T. Haslam, '11

Vice-president and Director, Standard Oil Company (N.J.); Director and member of executive committee, Ethyl Corporation; Professor of Chemical Engineering at M.I.T., 1920-1932; Director, American Institute of Chemical Engineers, 1928-1930 and 1932-1934; Vice-president, 1927.



Ferdinand Vogel

Underwood & Underwood

Luis de Florez, '11

President, de Florez Engineering Company, Inc. and Vice-president, Doubleday and Company, Inc.; Director of Special Devices Division, Bureau of Aeronautics, 1943-1945, becoming Deputy Chief of Naval Research, 1945; promoted to rear admiral, 1945; recipient of the Robert J. Collier Trophy in 1944 for achievement in aviation.



Volpe Studios



R.F. Haffenreffer, '95

chairman of the board, Narragansett Brewing Company and President of Herreshoff Manufacturing Company of Bristol, R.I.; President, M.I.T. Club of Fall River for many years; Director of the Museum of the American Indian, New York City; and recently appointed a member of the Rhode Island Port and Industrial Development Commission.

Beane of New York. To complete the unexpired term of the late Albert J. Browning, '22, XV, Luis de Florez, '11, II, President of the de Florez Engineering Company, Inc. and Vice-president of Doubleday and Company, Inc., has been nominated to serve on the Corporation until June 30, 1951.

New representatives on the National Nominating Committee to be elected this year (one from each district) are: *District 1* - H. B. Richmond, '14, VI; *District 2* - Portland, Maine, Club, James E. Barlow, '05, I; Montreal Club, Harold C. Pearson, '23, X; *District 4* - Albany Club, Charles E. Smart, '05, II; Buffalo Club, Gabe Hilton, '15, III; Rochester Club, Donald B. Webster, '16, X; *District 5* - New York Club, Winfield I. McNeill, '17, XV; Newark Club, George A. Chutter, '21, VI-A.

Tenney L. Davis: 1890-1949

TENNEY L. DAVIS, '13, Emeritus Professor of Organic Chemistry at the Institute until his retirement in 1942, died suddenly on January 25. Dr. Davis was born on January 7, 1890. He attended Dartmouth College for two years and then transferred to M.I.T. from which he was graduated in 1913 with the degree of bachelor of science in chemistry. Following graduate study at Harvard University, he was awarded the de-

gree of master of science in 1915 and that of doctor of philosophy in 1917. He joined the staff of the Institute in 1919 as an instructor and became a full professor in 1938. He was widely known as an authority on the history of chemistry, and his publications include *History of Chemistry and Alchemy*, *Chinese Alchemy*, and *Scientific Methodology*.

Upon the entrance of the United States in World War I, Dr. Davis was commissioned a first lieutenant in the United States Army, and for two years was connected with the Ordnance Department, engaged in the inspection and development of explosives in this country and in France.

Dr. Davis was a frequent contributor to *The Review* and one of its editorial associates from 1933 to 1941, and again from 1946 to 1948. He was also a former associate editor of *Isis* and of *Archeion*. In 1947 he was appointed editor in chief of *Chymia*, an international annual devoted to the history of chemistry, and had completed work on one volume. He was a member of the American Chemical Society and had been secretary of the History of Chemistry Division. He had also been corresponding secretary of the American Academy of Arts and Sciences, and was a member of the *Deutsche Chemische Gesellschaft*, *Societe chimique de France*, *Societe Suisse de chimie*, *Paracelsus-Gesellschaft*, and the History of Science Society.

Hydrodynamics Laboratory

PLANS for immediate construction of a Hydrodynamics Laboratory and Model Ship Towing Tank at the Institute were announced by Dr. James R. Killian, Jr., '26, at the Midwinter Meeting of Boston Alumni which was held at Walker Memorial on February 5. The new laboratory, providing extensive facilities for research in the behavior of liquids and gases, will be built on M.I.T. property in Cambridge.

The laboratory and towing tank, the first project whose construction is undertaken in the \$20,000,000 Development Program of the Institute, is expected to cost at least \$500,000. Because its need is so urgent, construction of the building is now beginning, although available funds designated for its construction are being supplemented by unrestricted funds of the Institute. It is hoped that later contributions will release the unrestricted funds for other purposes.

In recent years the increasingly important applications of fluid flow in industry have served to make hydrodynamics a field of great industrial and engineering significance. At the present time there is acute need, both educationally and industrially, for a laboratory on the eastern seaboard adequately equipped for work in all aspects of fluid mechanics. This new building will meet the most acute of the Institute's current needs for facilities to broaden its educational and research program in new fields of engineering and technology.

Henry Richards: 1848-1949

HENRY RICHARDS, '71, whose centennial birthday last July 17 was reported in the November, 1948, issue of *The Review*, died at his home in Gardiner, Maine, on January 26. He was the oldest living alumnus of the Institute — to which distinction he fell heir upon the death of his brother, Robert Hallowell Richards, '68, in March, 1945 — and the second oldest living alumnus of Harvard University from which he was graduated in 1869.

Mr. Richards studied at the Dixwell School in Boston and spent part of his boyhood in England, graduating from Wellington College, Berkshire. In 1869 he was graduated from Harvard University and completed a course in architecture at M.I.T. in 1871. He practiced architecture for seven years in Boston before returning to his ancestral home in Gardiner where he operated the Richards Paper Company and also a pulp mill at South Gardiner.

A grandson of Gardiner's first mayor, Robert Hallowell Gardiner, Mr. Richards took an active part in civic matters and in art. He designed the Gardiner Public Library and for many years was head of the Maine Public Health Association. For more than 60 years he painted in many parts of the world, but he is best known for his water colors of the Maine Coast. Last December a group of his water colors were exhibited in the Bowdoin College Museum of Fine Arts. Mr. Richards also illustrated several books written by his wife, the late Laura E. Richards, daughter of Julia Ward Howe who wrote "The Battle Hymn of the Republic." Together, Mr. and Mrs. Richards operated Camp Merriweather for boys at North Belgrade.

Refresher for Science Teachers

FOR teachers in secondary schools who want a refresher course to bring them abreast of advances in science, the Institute will offer 50 fellowships for a six weeks' program of study this summer. This program is made possible by a grant of \$62,500 from the Westinghouse Educational Foundation which will provide 50 M.I.T. Science Teachers' Fellowships of \$250 each, to be awarded to science teachers each summer for the next five years. The program is open to science teachers in high and preparatory schools in New England and New York State who are college graduates or have equivalent qualifications to carry on the courses.

In announcing the fellowship program, Dr. James R. Killian, Jr., '26, President, described the project as a special service to teachers to enable them to keep pace with, and be qualified to interpret, the latest developments in science. In Dr. Killian's words:

The foresight of the Westinghouse Educational Foundation in establishing this grant makes it possible for the Institute to offer its resources to a group of teachers whose influence in preparing youth for the problems of life is too often unappreciated. The program will bring into close fellowship men and women who have made the teaching of science their career. Their associations during their studies at the Institute will, we hope, send them back to their own classrooms refreshed and stimulated to carry on the important task of guiding their students through the first phase of higher education.

The Westinghouse Educational Foundation was created by the Westinghouse Electric Corporation in 1944 to support educational, scientific, and charitable activities. The Foundation provides funds for scholarships, fellowships, professorships, and other projects in connection with education and educational institutions.

Physics, chemistry, and mathematics in a combined lecture sequence will comprise one part of the fellowship program. The second part will cover general science, including recent developments in the fields of physics, chemistry, biology, meteorology, geology, and aeronautical engineering. The program will begin with registration on July 5, and continue through August 12.

Subjects to be discussed will be cosmic rays, nuclear physics, high-energy accelerators, radioactive tracers, large molecules, application of electronics to problems in biology, artificial stimulation of rain, determining the age of rocks by radioactivity, and problems of supersonic flight. In addition to formal lectures and laboratory illustration, teachers enrolled for the courses will have the opportunity to inspect the cyclotron and synchrotron at the Institute, the Van de Graaff electrostatic generator, the Acoustics Laboratory, the Spectroscopy Laboratory, Biology Laboratory, differential analyzer, and the subsonic and supersonic wind tunnels used for aircraft research.

To achieve the greatest degree of informality and teacher participation, frequent meetings will be held for general discussion of problems and methods of teaching science to boys and girls of high school and preparatory school age. On the recreational side, libraries and dining rooms and sports, swimming in the Alumni Pool and sailing facilities on the Charles River

(Continued on page 286)

BUSINESS IN MOTION

To our Colleagues in American Business . . .

A rather recent development in the housing field is the combination screen and storm window. This is installed permanently, and greatly eases the otherwise difficult job of changing from screens to storm windows and vice versa. An exceedingly interesting new window of this general type has just been shown to Revere because it is made of a Revere brass.

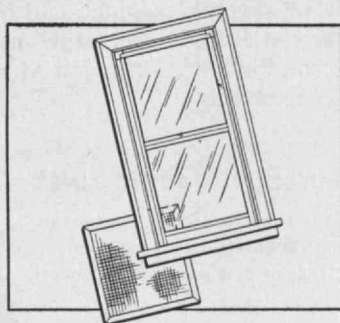
The new window is entirely brass-framed, and fits flush into the house window, making it wind-and-weather tight. It has two brass-bound glass panes sliding in brass channels and held firmly in place by a simple brass slide. These panes, either or both, can be removed by hand in a few seconds from inside the house, and a screen panel substituted. At the bottom of the window is a narrow brass insert which can be removed if only a small amount of ventilation is desired. An additional feature is the provision of a slip joint with $\frac{5}{8}$ inch play to take up expansion and contraction such as sometimes occurs, particularly in new houses, and to permit adjustment to older houses whose windows may not be quite true or uniform in dimensions.

Brass is a generic term, because copper and zinc can be successfully alloyed in various proportions. Thus there are many brasses. In addition, each is available in different tempers, gauges, and the like. The manufacturer of this window said that he had always regarded brass as a quality material, and never thought of using anything else. Since the

method of fabrication requires severe forming, including some 180-degree bends, he came to Revere for assistance in selecting the right alloy, temper and annealing technique. The result is a window that is good looking, with a golden red color. Under difficult weather conditions, as at the seashore, it stands up and should outlast the house. Naturally, it cannot rust, rot, or warp.

Revere's collaboration with the window manufacturer is typical. When requested, we are delighted to tell all we know about our many metals, not only the brasses, but also bronzes, coppers, and aluminum alloys. These are made in various forms, including sheet and strip, bar, rod and wire, forgings, and extruded shapes. The latter, incidentally, in brass, copper and aluminum, have many architectural uses, including windows, thresholds, hand rails and the like.

We regard every material as having its own advantages, many of which are not shared with other products. That is why there are so many different Revere metals and alloys, offering a wide choice. This diversity of products, and complete knowledge about them, is customary in American industry. No matter what any supplier makes, he is well informed about it, and is only too glad to share his knowledge. After all, his customers make it possible for him to increase his business and his knowledge. In other words, you pay for both experience and materials. Are you using both?



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THE INSTITUTE GAZETTE

(Continued from page 284)

Basin will be available to the visitors, as well as sightseeing excursions.

Because of the limit in the number of grants and dormitory facilities available, applications for the courses must be received by April 1. Inquiries should be addressed to Professor Francis W. Sears, '20, chairman of the Summer Program for Science Teachers Committee, which includes George P. Wadsworth, '30, Associate Professor in the Department of Mathematics, and Professor Leicester F. Hamilton, '14, of the Department of Chemistry.

Fathers and Sons See Tech Movie

APPROXIMATELY 800 M.I.T. Alumni, many with their sons of high-school age, attended the Midwinter Meeting of Alumni in Metropolitan Boston, held on Saturday, February 5, in Walker Memorial. In addition to having the opportunity to hear Dr. Compton in his new role as chairman of the M.I.T. Corporation, and Dr. Killian as the Institute's new president, Robley D. Evans, Professor of Physics, spoke on "Peacetime Atomic Energy" amplifying his remarks by means of slides and working models of several atoms. The electronic organ, gift of the Class of 1918, was put to good use as accompaniment to singing led by Orville B. Denison, '11, and the Kodachrome mo-

tion picture "M.I.T. - 1948" had its first public showing before an appreciative audience.

Informal talks by Dr. Compton and Dr. Killian recorded recent progress in the administration of the Institute and trends in higher education. Highlights of these addresses, such as the announcement of the building of the Hydrodynamics Laboratory and Towing Tank on page 284, are recorded in The Review. Not recorded elsewhere, as yet, is Dr. Killian's announcement that gifts to the Institute for the year 1948 were approximately \$3,700,000 — the largest in any single year except when George Eastman made his generous benefaction.

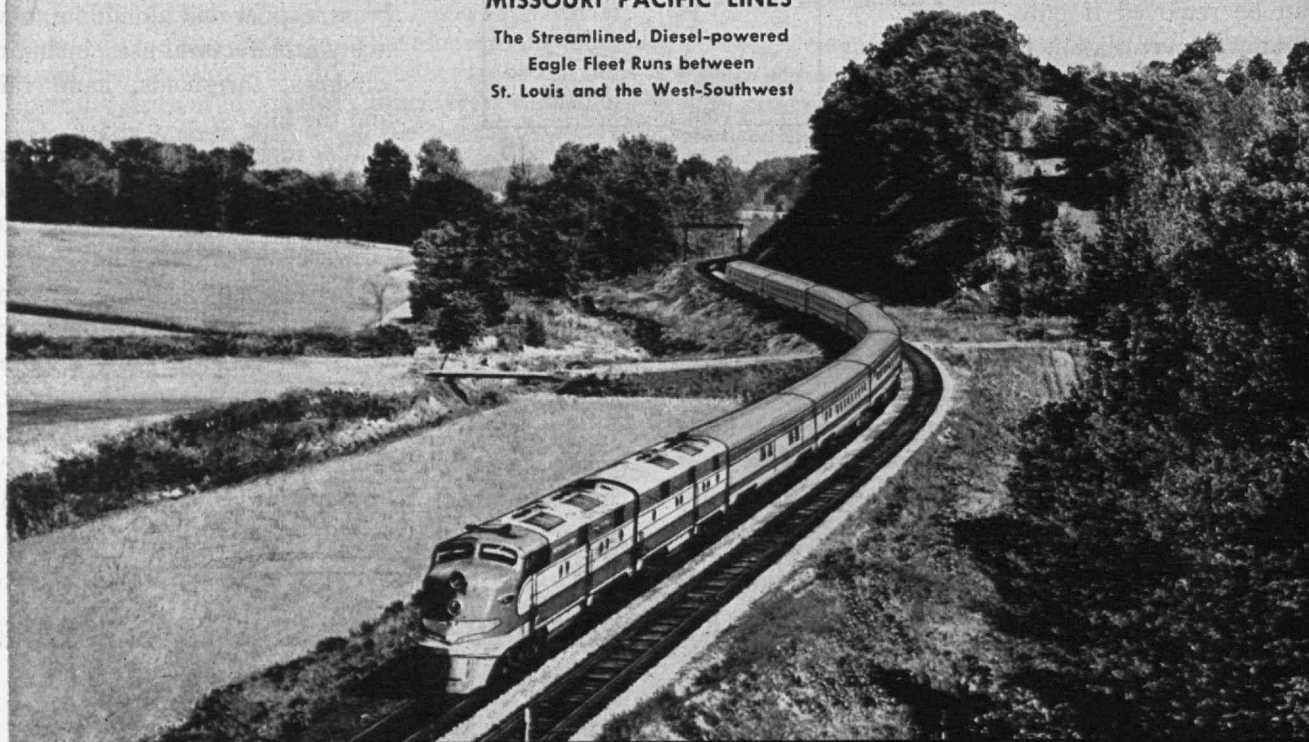
In speaking of the peacetime applications of atomic energy, Professor Evans emphasized the motto to be found at the Brookhaven National Laboratory — "Atomic Energy Is Here for Good." After a brief outline of atomic structure, Professor Evans told his appreciative audience of the work which has been carried out during World War II in the preservation of blood (recorded in the December, 1946, issue of The Review), and outlined research now in progress in which radioactive tracer techniques were being applied in medicine and engineering.

The colored motion picture, to be exhibited before alumni groups, showed the principal activities taking place at M.I.T. during 1948. In addition to reflecting student life, the movie displayed the progress which had been made in the construction of the new Senior House, the Rockwell Cage, and the Charles Hayden Memorial Library, on which the major por-

(Continued on page 288)

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THE INSTITUTE GAZETTE

(Continued from page 286)

tion of the steel work has been erected. Views of the Foreign Student Summer Project, the summer camps at East Machias, Maine, and at Crystal Farm, Nova Scotia, were shown, and the audience also enjoyed views of rowing and dinghy crews on the Charles River, as well as glimpses of the visitors at the last Open House event which was held in May, 1948.

Edward E. Bugbee: 1876-1949

WITH regret we announce the death on February 2 of Edward E. Bugbee, '00, who was associate professor of mining engineering when he retired in 1941. He was widely known in the field of mining and metallurgy and was an authority on fire assaying. He served from 1940 to 1941 as exchange professor at Stanford University.

Born in Brookline on October 5, 1876, Professor Bugbee received his early education in the public schools of that town, and was awarded the degree of bachelor of science in Mining Engineering and Metallurgy by the Institute in 1900. Following graduation, Professor Bugbee became an assistant instructor in metallurgy at M.I.T., and was promoted to instructor the following year. For three years, beginning in 1903, he was assistant professor of mining engineering and metallurgy at Iowa State College. In 1906-1907 he served in the same capacity at the University of Washington, and then rejoined the Institute as assistant professor of mining engineering and metallurgy.

Professor Bugbee served as an assayer for the Brookfield Mining Company in 1901-1902; as special agent for the United States Census in 1903, and at one time assistant geologist for the United States Geological Survey. During 1918 he served as assistant educational director of the Committee on Education and Special Training for the War Department.

Town Meeting

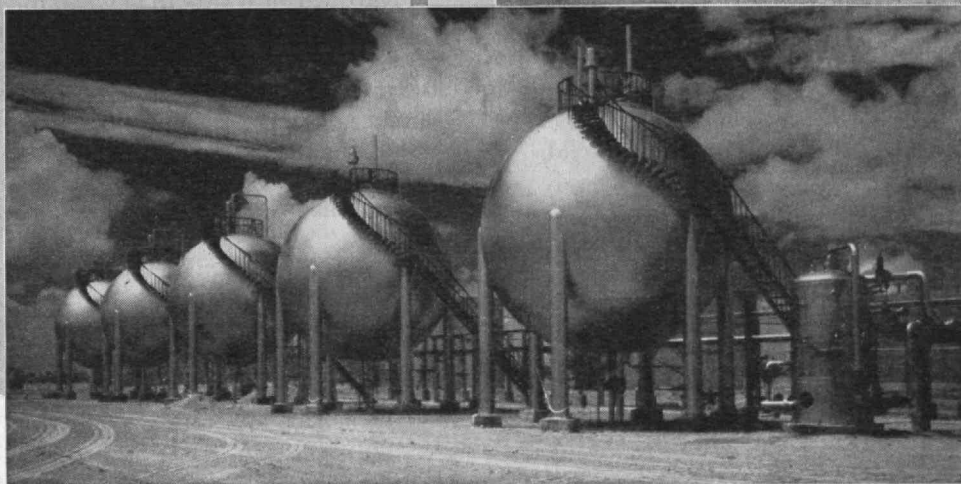
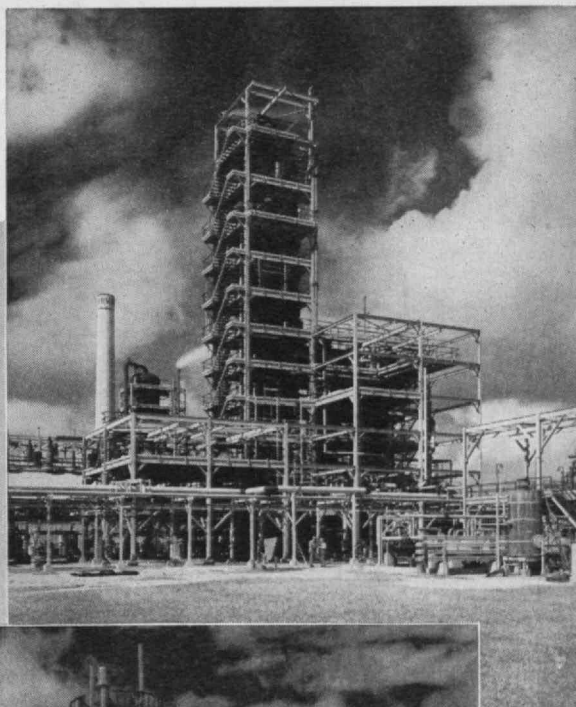
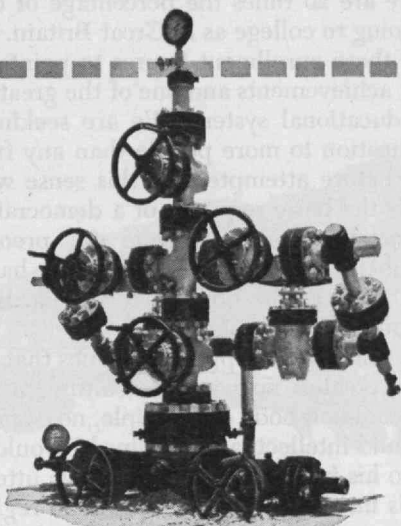
IN a nation-wide radio broadcast on the Town Meeting of the Air on the evening of January 25, President James R. Killian, Jr., '26, joined George D. Stoddard, President of the University of Illinois, Clifton Fadiman, member of the Book-of-the-Month Club Board, and Paul H. Douglas, Illinois State Senator, in a discussion of the extent to which higher education in the United States is meeting the needs of modern man. President Killian emphasized the need to provide adequate means to train exceptional students in institutions able to maintain their academic and financial independence in the following remarks:

"At M.I.T. we were recently comparing notes with a distinguished British educator. He was astonished to learn that nearly 2,500,000 students are enrolled in American institutions beyond the high-school level. Since the comparable enrollment in the United Kingdom is nearer 50,000, we estimated, taking into account the relative populations of the two countries,

(Continued on page 290)

FROM WELL HEAD to FINISHED PRODUCTS

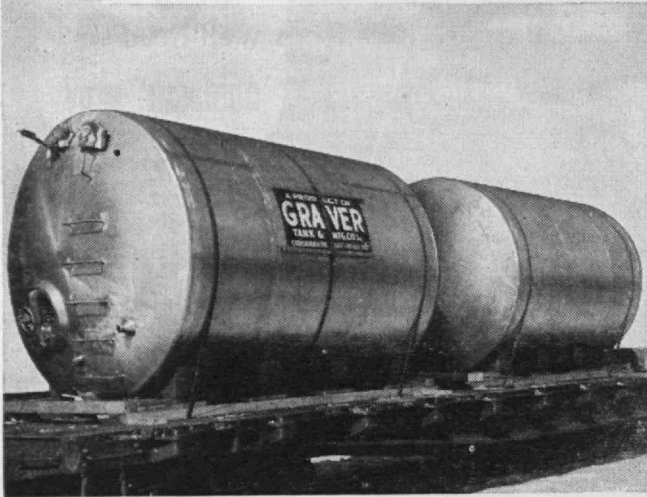
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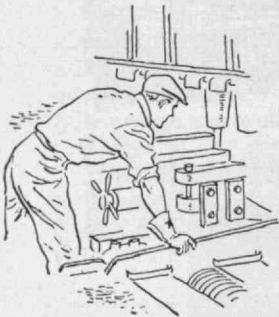
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that there are 20 times the percentage of our young people going to college as in Great Britain.

"I cite these enrollment figures to point up one of the great achievements and one of the great problems of our educational system. We are seeking to give more education to more people than any free nation has ever before attempted. In this sense we are approaching the basic requisite of a democratic society for universal education. But in our preoccupation with numbers, it is not surprising that we have not yet achieved some of the qualitative standards essential to well-rounded education.

"But when Walter Lippmann argues that American education creates 'no common culture, no common faith, no common body of principle, no common body of moral and intellectual discipline,' I would disagree both as to his implication that we have utterly failed and in his insistence that we should so regiment our people. I would like to point out also that the sheer numbers which already characterize our educational system and whose vastly increased augmentation is envisaged in the near future create enormous difficulties in the way of the achievement of Mr. Lippmann's objectives—even if we assume that all the latter are desirable.

"As I see it, certain common objectives are already beginning to emerge which are designed to meet the needs of modern man more fully than is presently the case. Let us state these goals briefly:

"First, we must provide social and political education. In American terms we must educate for citizenship in a democratic society. Here we are making steady progress, but much more remains to be done.

"Next, we must seek to develop the human being as a free and responsible individual, with moral standards and with inner resources. Here we must follow the precept of the great philosopher, Whitehead, that 'moral education is impossible without the habitual vision of greatness.'

"Third, we must provide our young people with those skills necessary to master a vocation or profession.

"Since I come from an institution devoted to professional education in science and engineering, my part in this discussion is to support the validity of this third objective. This I do enthusiastically but with the condition that vocational education must be fused with the other two objectives. Again Whitehead provides the prescription when he says that 'a merely well informed man is the most useless bore on God's earth. . . . What I mean is that every form of education should give . . . a technique, a science, an assortment of general ideas, an aesthetic appreciation, and that each of these sides of his training should be illuminated by the others.'

"I also believe that our specialized institutions—as, for example, our schools of science and engineering—have made important contributions, aside from their professional training, to the education of modern

(Concluded on page 292)



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BELL TELEPHONE SYSTEM



Norman
Rockwell

THE INSTITUTE GAZETTE

(Concluded from page 290)

man. They have thrown off the burden of inert ideas encrusting some types of education. They benefit from the student motivation inherent in specialized study. They give their students the inner satisfaction of being able to do something useful and to do it well. Their curricula have pointed the way to a unity, a discipline, and a creative attitude that largely were lost when the classical curriculum became outmoded.

"So far I have suggested some of the goals and achievements which are bringing education more nearly in accord with the needs of modern man. We still have much to accomplish. We must find ways of financing our private institutions so that they may remain free and independent. We must continue the process of fusing social, moral, and vocational objectives. We must find ways of encouraging the exceptional student, so that he progresses at his own speed. We must encourage creative scholarship, minds 'forever voyaging through strange seas of thought alone.' We must seek to provide what Plato called 'the science of good and evil,' a true sense of the first-rate.

"If we can continue our progress in achieving these goals, we can educate for the needs of modern man."

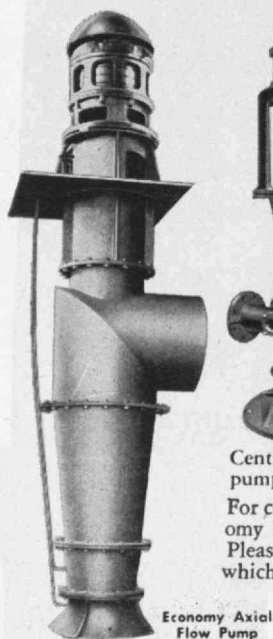
ARCHITECTURAL ACOUSTICS

(Continued from page 280)

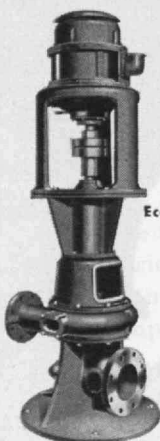
useful knowledge by examining separately the many variables which enter into studio design. Ambient noise, vibration, restrictions imposed by size and shape, the effect of acoustical absorbents in altering the reverberation time, sound diffusion, and absorption of sound at different frequencies are all physical factors which can be measured by existing techniques. A knowledge of all of these factors is necessary before acoustical engineering can assume the quantitative status which characterizes many other branches of engineering.

At the present time, the second phase of the project is under way. The properties of the studio are measured primarily to determine whether they satisfy the following general physical characteristics: (1) freedom from extraneous noise; (2) freedom from faulty distribution of sound, that is, the avoidance of dead spots, echoes, and sound foci; (3) satisfactory reverberation control, that is, sufficient separation of individual sounds to satisfy speech intelligibility requirements and musical taste. To some extent, all of these factors involve subjective considerations so that a final and conclusive answer cannot be expected from physical measurements alone.

(Continued on page 294)



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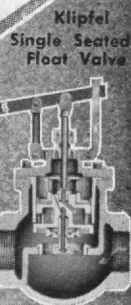
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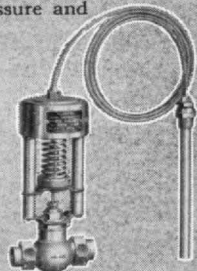
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Change Your Mind...

Most of us have, at one time or another

by J. L. SINGLETON
Vice-Pres. and Director of Sales,
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ALLIS-CHALMERS MANUFACTURING CO.
(Graduate Training Course 1928)

You may be one of those men who knows exactly the sort of work he wants to do when he finishes engineering school. I did. I was going into straight engineering work. But I became a salesman.

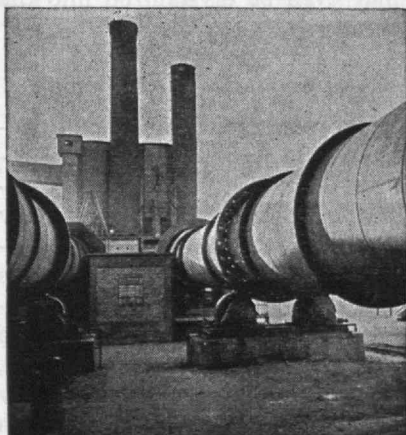


J. L. SINGLETON

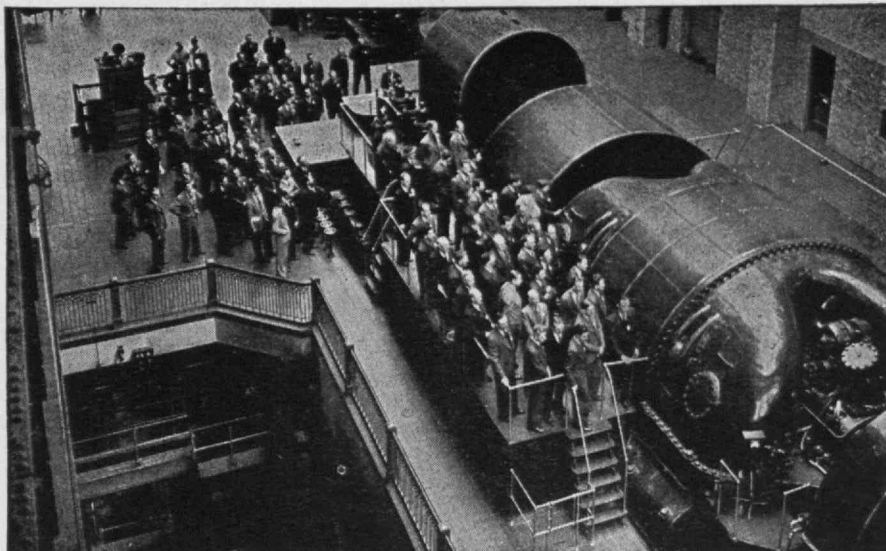
I've noticed since that it's not unusual for Graduate Training Course students at Allis-Chalmers to change their minds. Here, opportunities have a way of seeking out a man according to his ability. Sometimes these opportunities are in fields that he had not fully understood or considered before. There are so many kinds of work to do here that a man is almost sure to end up in work that will bring him the most in personal satisfaction and advancement.

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If you have ability and a leaning toward sales work, you'll have plenty of chance to test and develop it at Allis-Chalmers during your Graduate Training Course. Then you take your place in a Coast-to-Coast sales organization—perhaps even in a foreign office.

Many Fields Are Open

Or, maybe you'll change your mind. Research and development—or manufacturing—or design engineering may prove your field. The point I want to make is, all of these things are open to you at Allis-Chalmers. This company is in intimate touch with every basic industry: mining and ore processing, electric power, pulp and wood products, flour milling, steel, agriculture, public works.

The Graduate Training Course here doesn't hold you down. You help plan it yourself, and are free to change as you go along. You work with engineers of national reputation—divide your time between shops and offices—can earn advanced degrees in engineering at the same time.

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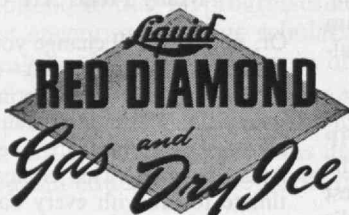
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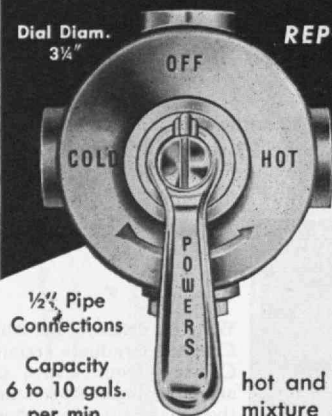
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ARCHITECTURAL ACOUSTICS

(Continued from page 292)

Techniques for Determining a Few of the Most Important Criteria in Architectural Acoustics

The reverberation time of a room can be measured by introducing into it a complex sound such as a warble tone, or bands of frequencies of filtered noise. After steady-state conditions have been reached, the sound source is suddenly stopped, and sound pressure is measured. From the decay curve of the sound pressure, plotted by a graphic level recorder, the reverberation time is calculated.

The sound field in a room can be determined by observing the sound pressure at one location due to a steady source at some other location. One method of doing this is to keep the position of the microphone and the sound source constant while the frequency of the source is changed slowly with time. As the frequency changes, the sound pressure at the microphone fluctuates due to the slowly changing patterns of standing waves in the room.

The diffusion characteristics of an enclosure can be measured by using a highly directional microphone. A diffuse sound field is one in which, on the average, there is no preferred direction of energy transmission. The orientation of the special microphone can be changed continuously in both angle and altitude. A graphic level record of the sound pressure at the microphone, as the orientation of the mounting is changed, will indicate the degree of diffusion provided by the room. Other methods for studying diffusion include mapping the sound field throughout the room while a steady sound is maintained, measuring reverberation time at many positions in the room, and determining the way in which the transmission of a steady sound between two points in the room varies with frequency.

The purpose of objective testing encompasses more than the determination of the physical characteristics of a room; the attendant development and evaluation of the instrumentation and theory in themselves are a logical and useful contribution to the field of room acoustics. Existing methods of measuring the acoustical qualities of a studio are admittedly inadequate. This condition is a drawback in one sense; yet, in another it affords a certain stimulus to research. It is hoped that more explicit techniques will some day be evolved; that a gradual sorting out of data and their implications may even be crystallized into the form of acoustical standards.

Subjective Aspects of Acoustical Engineering

When the design of a room is accomplished in accordance with the known theory and the best experience which is available, and when the physical acoustic properties of the room have been objectively measured, there is still no true measure of the acoustic quality of the room. A great deal of data on the characteristics of a room can be obtained through objective test, but the final analysis of "goodness" has to be based on subjective test, or, on human judgment, for the final criterion is the greatest possible auditory pleasure and intelligibility. It follows that, although physical tests can be made which guide acoustical design, it is ultimately necessary to consider the room in connection with the group of persons who are to use it for a specific purpose. Thus, there are auto-

(Continued on page 296)



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ABC

Here's another career story that'll interest college men H.C.C.

Things broke fast in 1940. In June I was graduated from Harvard with a degree in Physics. By October I was a Meteorological Cadet in the Air Force. Then, after five and a half years in the service, I was a civilian again. *(He came out a Lt. Col. — H.C.C.)*

That brought me to a career crossroad. Physics was too far in the past to return to, and meteorology didn't appeal to me as a lifetime job.

So I decided to draw up a description of the career I'd really like. Some sort of selling was indicated, because I don't like paper work, but do like to move around and talk to people. I wanted freedom of action—a business of my own that didn't require a lot of capital. I didn't want a ceiling on my earnings, nor a slow climb through a seniority system. And, after seeing the inhumanities of war, I felt that if, in addition, I could be of some public service, the job would be just about perfect.

Life insurance, it turned out, was the only field that fitted all these specifications. And that discovery brought me to the question, "Which company?". I began my search by calling on New England Mutual. Six weeks and eight companies later, after exhaustive comparisons, I was back at New England Mutual, taking an intensive training course. After that, I started out on my own in San Francisco, the city of my choice.

(He sold over \$300,000 of life insurance his first year H.C.C.)

Today, two and a half years later, I know I chose the right career and the right company. I'm still getting the finest training available, and I'm at home in "The best paid profession in the world." My income is in exact proportion to the time and effort I put in. And best of all, I enjoy the deep satisfaction of knowing I'm helping others—helping them achieve that vitally important goal, financial security.

James M. Banghart

GRADUATES of our Home Office training courses, practically all of them new to the life insurance business, are selling at a rate which produces average first-year incomes of \$5600. The total yearly income on such sales, with renewal commissions added, will average \$5700.

Facts such as these helped James Banghart solve his career problem. If you'd like to know more, write Mr. H. C. Chaney, Director of Agencies, New England Mutual Life Insurance Company, 501 Boylston Street, Boston 17, Massachusetts.

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matically injected into the problem certain physiological and psychological matters of sound perception and appreciation which have a direct bearing on engineering design and which need be taken into account. The correlation between the physical measurements and the subjective aspects in which a human being is considered a part of — or at least an element in — the overall engineering design, is an important element in teaching and research which, up to now, has not been fully exploited. This phase of the work also brings the student into direct contact with certain aesthetic problems, since rooms and studios should be good for the reproduction of music as well as of speech, so that at least some knowledge of music is essential to the acoustical engineer.

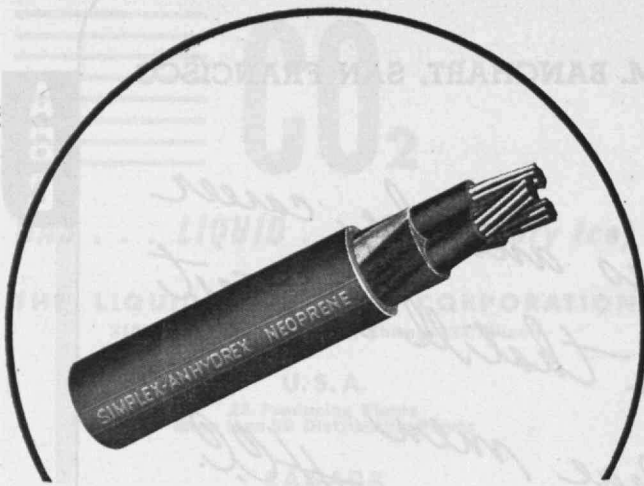
Thus, the third and final phase of the M.I.T. research program in room acoustics is the testing of the studio from a subjective or psychological standpoint. It is hoped to determine the acoustic "quality" of the studio, within the limitations set by subjective evaluation, by testing group reactions to speech and music, and by studying the relationship between subjective and objective data.

Within the last 20 years, a definitive method of evaluating speech intelligibility, called an articulation test, has been developed. Generally, an announcer reads specially prepared lists of sentences, words, or nonsense syllables to a group of listeners who have, preferably, some training in phonetic recording methods. The percentage of items correctly recorded by these listeners is called the articulation score; this percentage is taken as a measure of the intelligibility of speech. Since the nature of the spoken items helps to determine the resulting articulation scores, the test material must be carefully selected if a proper assessment is to be made. The speech sounds used are, for most testing purposes, representative of conversational speech, although they do not, in themselves, convey any meaning which might improve the score. Conforming to this general method, a listening group will be selected to record the intelligibility of speech lists when read in the studio. The articulation index obtained, in addition to giving a measure of quality, may possibly supply significant information when correlated with the sound decay characteristics.

In the evaluation of musical sound, there is no index of acoustic quality comparable with articulation data since understanding as it pertains to the spoken word does not enter into the appreciation of music; pleasure and clarity cannot be broken down into discrete measurable units. A qualitative index is difficult to obtain for there is the problem of having the same group of people listen to the same musicians playing the same music on the same instruments in two or more rooms successively without any appreciable time lag. Only then might a comparative study of room quality be feasible.

Needless to say, the rating of a room depends a great deal upon the musical taste and disposition of the listeners. Musical taste is certainly conditioned by

(Concluded on page 298)



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ARCHITECTURAL ACOUSTICS

(Concluded from page 296)

experience. Music has been heard extensively in reverberant rooms and much of the music of the past has been composed to be played in at least moderately reverberant rooms. Since the sound of a musical instrument cannot be freed from the influence of the room in which it is played, the reverberation characteristics of the room are vitally important to the quality of the music heard.

It is generally agreed that the acoustic conditions for speech are not the same as those for music. Moreover, different types of music are more or less designed for different reverberation characteristics. Therefore, ideally, every room should have many optimal reverberation times instead of only one. In spite of natural differences in musical taste, such experiments as have been performed have indicated that the tastes of different listeners are in fairly good agreement. A judgment of the musical quality of the M.I.T. studio is contemplated, although as yet the scope and methods have not been decided upon.

It is obvious that the aspects of the field of architectural acoustics are many and diverse, and it is clear why any approach to its problems must be a composite one. There is still much to be done and it is with co-operative research in electronics, physics, architecture, psychology, and acoustics that material advances will be made. It is felt that a new and successful approach has been made to integrated teaching and research procedure.

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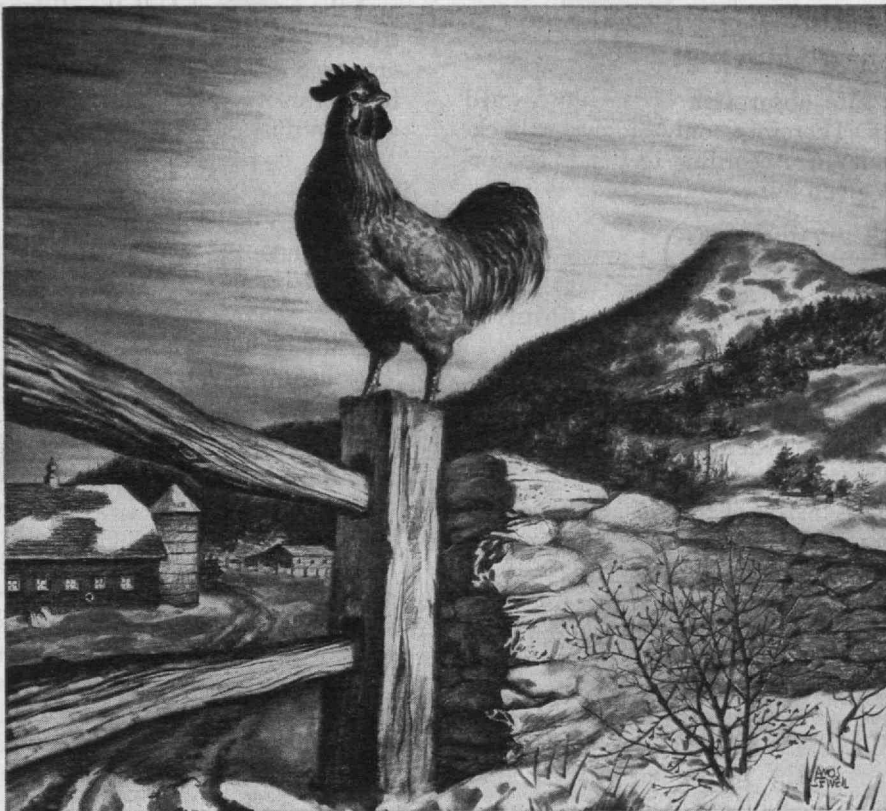
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THRUST PROBLEMS IN DAMAGED ARCH BRIDGES

(Continued from page 278)

designed for the safe absorption of the downward bending moments. Therefore, only sideways buckling will be considered. According to the Euler formula the thrust is given by:

$$P = \left(\frac{\pi n}{L} \right)^2 \left(\frac{EI}{C} \right)$$

P is the maximum allowable pressure (thrust) in pounds

n is 1 (because both ends of the column are unrestrained)

E is the modulus of elasticity of steel, assumed as 30,000,000 pounds per square inch

I is the moment of inertia of the weakest cross section of the structure about its vertical axis, in (in)⁴

c is the factor of safety, here assumed to be 2½

L is the length of the span in inches, here 672×12 inches

The two main trusses have a distance (d) of 200 inches, on centers, and the minimum steel area (A) in each single truss is about 100 square inches. Since there are two trusses, the moment of inertia is approxi-

mately the product of the steel cross section area ($2A$) and the square of half the distance (d) between the trusses (neglecting the moment of inertia of the truss cross section about its own center of gravity). In the form of an equation we may write the moment of inertia, in this case, as

$$I = 2A \left(\frac{1}{2}d \right)^2 = 2,000,000 \text{ inches}^4$$

Substituting this expression into the equation for the maximum allowable pressure, we find the Euler formula to take the form

$$P = \frac{1 \times \pi^2 \times 30,000,000 \times 2,000,000}{2\frac{1}{2} \times 672^2 \times 144}$$

and numerically we find that

$$P = 3,700,000 \text{ pounds} = 1,850 \text{ tons}$$

The steel is subject to bending stresses in addition to stresses due to buckling. However, the allowable load limit in case of buckling, as computed above, is 1,850 tons or almost 10 times the anticipated load. Therefore it can be assumed that the bending stresses and stresses due to wind load will not be augmented substantially, and that the heavy SKR bridge can safely absorb this increase in stresses. As the present bridge is slated to be in use for at least 20 years, the adoption of the counterthrust lever appears to be advisable, and its installation would provide positive safety against any danger of further pier and arch deflections, with no special maintenance requirements.

(Concluded on page 302)



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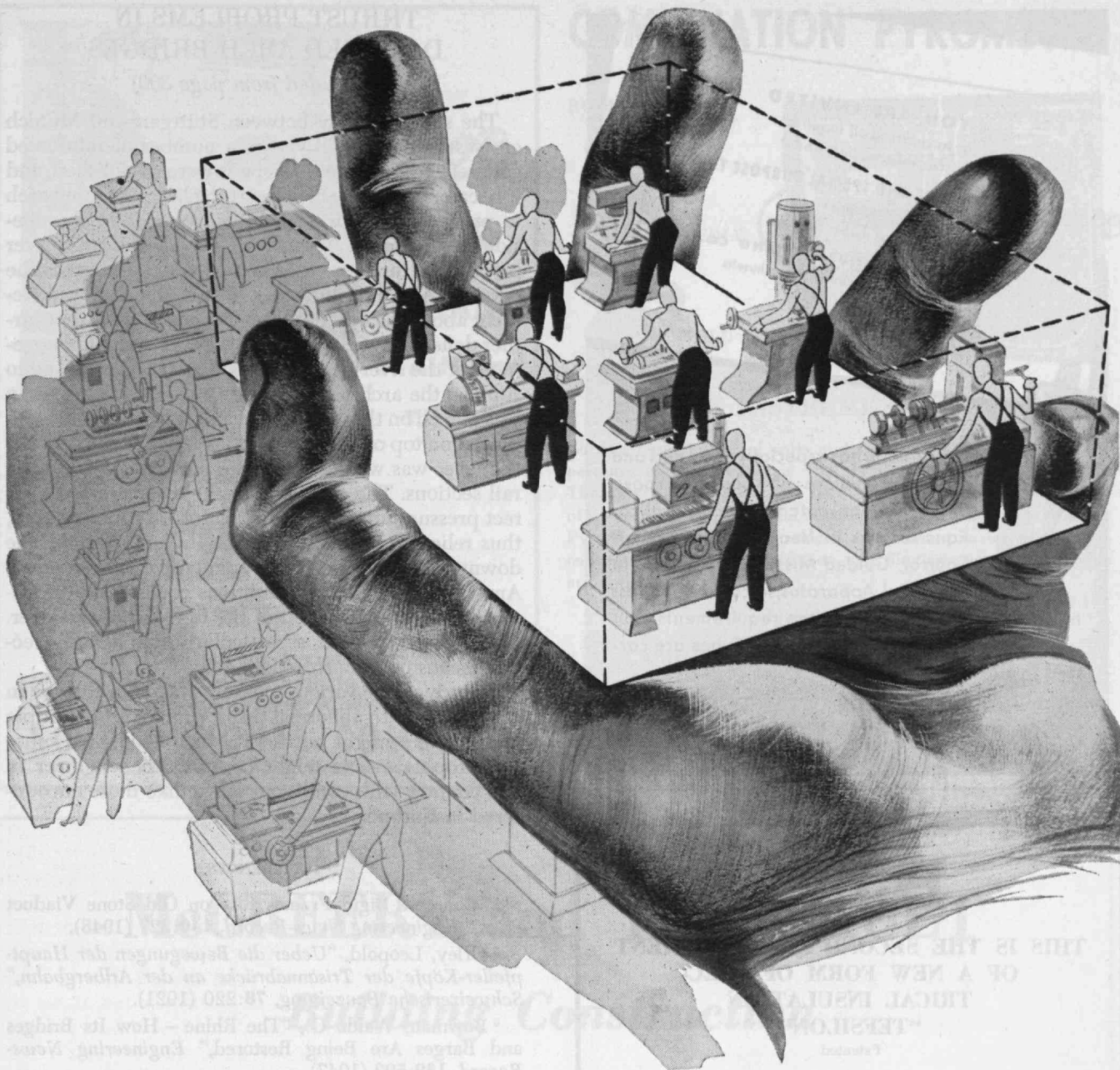
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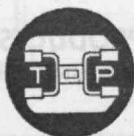
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THRUST PROBLEMS IN DAMAGED ARCH BRIDGES

(Concluded from page 300)

The superhighway between Stuttgart and Munich crosses the Neckar River on a number of reinforced concrete arches. The river spans were demolished, and it became necessary to support the last remaining arch to prevent its collapse as a consequence of the one-sided arch thrust. This thrust was causing the river pier of the three-point arch to give way towards the outside. A significant crack developed in the pavement above the other (abutment) pier. To prevent further deflection of the arch crown and horizontal movement of the river pier, a lever system was employed to support the arch, as shown in Fig. 7. A steel column was placed on the ground and a horizontal I beam was placed on top of it to serve as a lever. The long end of the lever was weighted down with a number of steel rail sections. The short end of the lever exerted a direct pressure upward on the reinforced concrete arch, thus relieving part of the horizontal arch thrust. The downward deflection of the arch crown was reversed. Any change in ground conditions could easily be absorbed by the movement of the free end of the lever. This method provides a particularly simple and effective means of reconstruction.

A study of the various measures taken in Europe in connection with abnormal thrust problems in multiple arch bridges might be useful, since floods and other catastrophic events might confront the engineer in this country with conditions not unlike those encountered in Europe.

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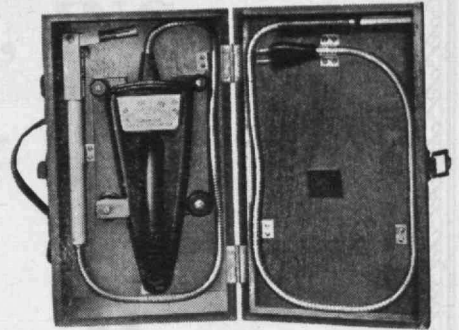
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SOIL CONSERVATION

(Continued from page 274)

It seems that engineers, as well as all other technical personnel in conservation, must have a fundamental understanding of the interrelationships between living things and their environment. They must furthermore be conscious of other technical fields having a bearing upon their own, and be capable of obtaining help from the technicians in those fields. Thus the work of the engineer can become actually integrated with work in other fields. For those of us trained in a specialized field of knowledge it may seem no responsibility of ours to relate our work to that of others. The average technician may get by that way. The one who will advance in his special field in the days ahead will be the one who knows how to relate his work effectively to that of others.

Resources versus Population

Special emphasis should be given to the importance of the conservation of natural resources. This can be done by reference to a simple equation:

$$L = E/P$$

In this equation L represents level of living; E represents environment or resources; P represents population. When one of the elements in any such relationship varies, the others vary, as you well know.

We have discussed one of the elements in our natural environment, the soil. We might have discussed any other, renewable or nonrenewable, with much the same effect upon this relationship. Soil as a useful resource is declining. It is scarcely anywhere as productive as it was once. It has been depleted of fertility, and it has been physically destroyed by erosion in many parts of this country and of the world. Granting that we may be able to do a great deal through modern methods of controlling erosion and better techniques of land use, even so the amount of productive land in the world is limited. In the United States we now have about three acres of cultivable land per person. This is a little better than the two and a half acres required to produce enough food to keep a person in good health, to say nothing of the cultivated land needed to produce other agricultural products. Many countries of the world have much less.

What of population — the P of the equation? In the year 1650 there were only 500,000,000 people in the world. In 1940 there were five times that many —

(Concluded on page 306)

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SOIL CONSERVATION

(Concluded from page 304)

2,500,000,000. The world's population is increasing at the rate of 20,000,000 per year. The population of the United States increased 2,500,000 in 1946. The world's population in the past hundred years has doubled. This is a sobering fact. Some students predict a population as high as 185,000,000 in the United States by 1975. What of the two and a half acres of good cropland needed to grow food for each of us then?

What then of the level of living — the L of the equation? If E (the environment in terms of resources) is constant in that natural resources are limited, and P (population) is increased, then L (level of living) must become less, and so it has in many parts of the world.

Consideration of such a relationship reveals that the increasing pressure of world population upon the resources required to support it is one of the most vital problems of the present day. What we are doing to use our soil resource more wisely is one of the attempts to help solve this problem. Food and many other agricultural products come from the soil and so far as we can foretell now, will continue to come from the soil for many long years ahead.

In soil conservation, as in the struggle to use all our resources so that they may support the peoples of the world today and tomorrow, the engineer has an important and conspicuous responsibility. He will need to lend his most enlightened support to programs of conservation in this country and in other countries during the years ahead. In this respect, M.I.T. takes a most progressive step by offering, in 1949, a course in Principles of Conservation. Without the help of the engineer, closely correlated with the efforts of many others working in related fields, we cannot achieve conservation of the soil or the wise use of any of the natural resources upon which the welfare of peoples fundamentally depends.

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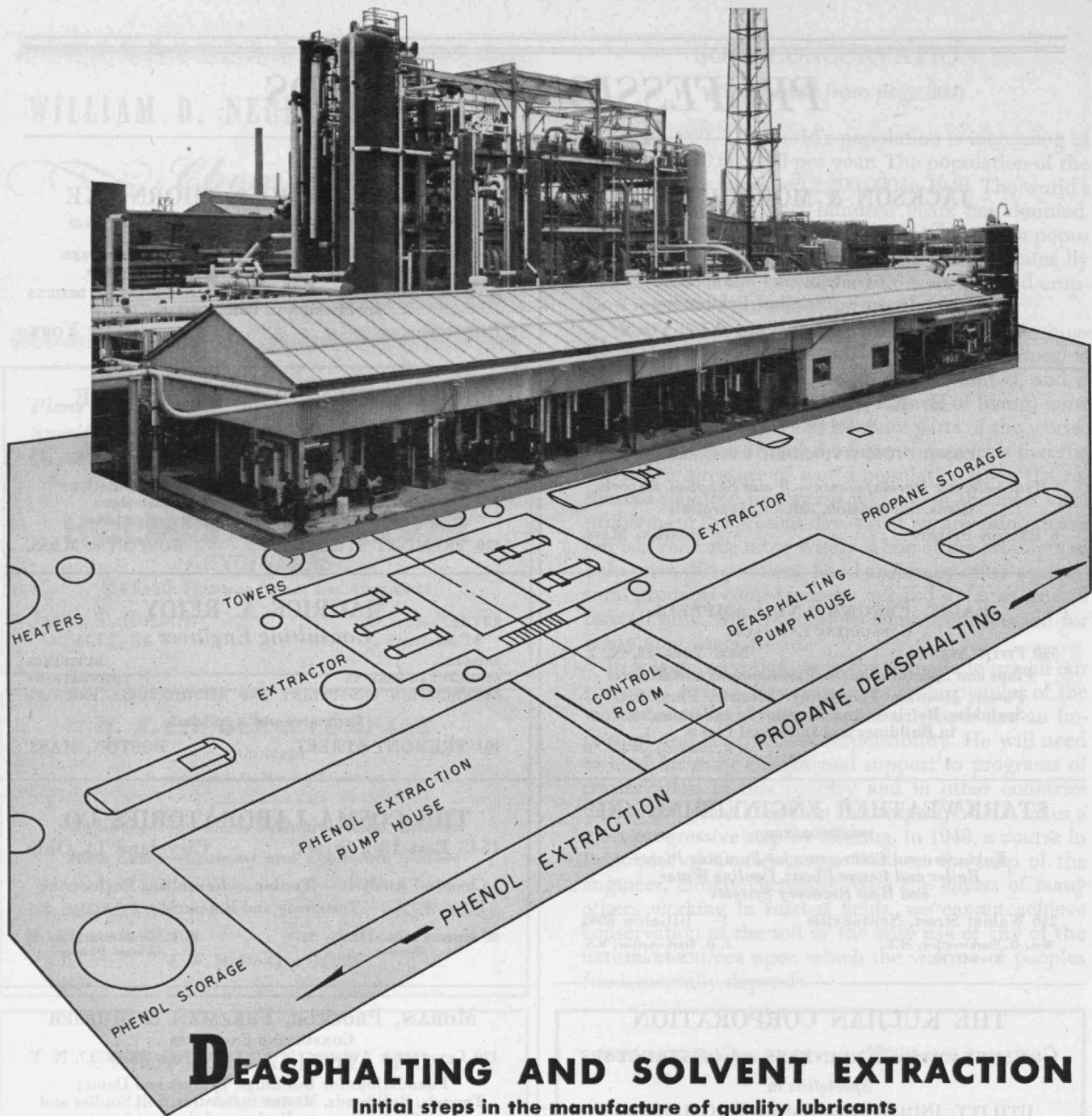
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The M. I. T. Alumni Fund

David McCord's fame as a poet and author is great. Less well known, outside of Harvard circles, is the fact that he has directed Harvard's alumni fund since its beginning in 1926. He knows Class Agents, therefore, at first hand and recognizes their problems and their worth from long experience. To the best of our knowledge, the Class Agent has never before been immortalized in verse. Mr. McCord's composite picture may give you a better insight into the trials and tribulations of this unique product of the American educational scheme.

THE LITTLE CLASS AGENT

By DAVID McCORD

The little Class Agent — he does what he can,
Though never quite sure is he mouse or a man.
He signs all his letters — receives all the checks,
To some he's a god and to others a hex.

To some he's a friend and they tell him their woes;
To some he's anathema: foe among foes.
To one he is selfless and sterling and strong,
Another is sure he's a Good Man gone wrong.

He hears ten complaints for one whisper of praise.
He has to work nights which he does in a daze.
He answers long questions, runs errands at will,
And dreams of the college back there on the hill.

His mail is enormous, his patience extreme,
His spirit is low, but he clings to the Dream.
He's in love with his work though he says he is not.
He's got what it takes and he takes what we've got.

He asks for a hundred, will settle for one;
His work just begins when he thinks it is done.
Some call him a wonder, some wish he were dead,
Some doubt that the man can be right in his head.

He asks all the questions, regrets the replies;
For the size of each gift he gives six private sighs.
He hopes for the best, and the worst of it is
That the best is a goal that will never be his.

Alumni will write him clear out of the blue.
Their seats at the game were in section six-two;
And section six-two's right behind the wrong goal,
And he'd better *do* something, God save his poor soul!

There's a man out in Fargo. He's mad as a bull
Just because some old banker with some sort of pull
Turned up at Commencement, and what did he see?
Why, the blithering blighter was made LL.D.

Take the case down in Washington: How about *that*?
The worst of the boys are right out of your frat,
And a faculty member who ought to be fired
Is advising taxation the Reds have inspired.

He's one in a hundred, five hundred, or ten,
This man among mice and this mouse among men.
The world goes to pot and the nations to war:
Is this what we make him a Class Agent for?

In peace and in plenty, in bad times and ill
He gathers the grist for the Old College Mill.
He knows when he dies that no statue or plaque
Will honor this jack of all trades. But the jack

That he traded his days for will earn its percent
Till someone remembers, alas, it is spent.
To himself he's no martyr in whole or in part,
But him Alma Mater still hugs to her heart.

Alumni AND Officers IN THE News

New York Club Host to Civil Engineers

A number of Alumni who were attending the annual meeting of the American Society of Civil Engineers in New York gathered at an M.I.T. luncheon at the Commodore Hotel on January 20. This yearly event is sponsored by the M.I.T. Club of New York and has had a run of 15 successive years. The principal speaker was JOHN B. WILBUR'26, Head of the Department of Civil and Sanitary Engineering. Professor Wilbur reviewed recent developments at the Institute and pointed out that while total enrollment is directed downward toward a desired stabilized number, the Civil Engineering enrollment is increasing. The three new Civil Engineering options are in operation in the junior year and will extend to the senior year in 1950. A preliminary distribution of juniors among the options is (a) theory and design, 13; (b) planning and administration, 10; (c) construction and management, 35. Thought is being given to the reason for the preponderance of students in the third option.

The efficient toastmaster for the occasion was A. T. GLASSETT'20. S. H. REYNOLDS'22, President of the local Club, gave an enthusiastic welcome to the group. C. GEORGE DANDROW'22, President of the Alumni Association, was present and THOMAS C. DESMOND'09, as chairman of the Visiting Committee of the Department of Civil and Sanitary Engineering, reviewed that committee's report and assured the group that the department is making very good progress under an able leadership. Professor C. B. BREED'97 told stories in his usual entertaining manner. Professor ARTHUR T. IPPEN discussed the need for a new hydrodynamics laboratory and expressed the belief that funds for a new structure will be available soon.

In addition to the above, the following were present at the luncheon: 1900: P. L. PRICE, T. C. TUCK; 1901: A. G. HAYDEN; 1902: W. C. TAYLOR; 1903: C. E. CHASE, H. S. MORSE; 1904: W. T. WILSON; 1905: W. E. SIMPSON; 1906: E. S. CHASE; 1907: W. W. PAGON; 1908: K. R. KENNISON; 1910: J. B. BABCOCK, 3d; 1911: R. H. GOULD; 1915: M. W. COWLES, C. W. WILLIAMS; 1916: W. D. BINGER; 1917: I. B. CROSBY; 1918: A. B. SANGER; 1919: EUGENE MIRABELLI; 1920: MEDWIN MATTHEWS; 1921: W. F. KENNEDY; 1922: W. H. MUESER, J. H. TEETER, J. F. HALPIN; 1923: W. S. WISE, W. S. LALONDE, JR.; 1923: J. M. ROBBINS; 1924: E. S. SHEIRY, W. J. GRESS, J. E. JACGER, W. L. KEP-LINGER, JR., NATHAN SCHOOLER, F. E. MANLEY; 1925: M. G. SALZMAN; 1926: E. J. MCGREW, JR., A. S. HEYSER, A. DEH. HOADLEY, R. S. M. LEE, W. H. LATHAM, J. G. WALKER; 1928: ROBERT COOK, M. M. COREN, G. C. JACOBY, C. H. TOPPING; 1929: R. R. PHILIPPE; 1930: T. A. MIDDLEBROOKS; 1931: C. C. WALKER; 1932: T. A. LANE, W. L. WELLS; 1933:

J. C. KING, P. C. RUTLEDGE; 1934: D. W. TAYLOR; 1935: J. L. STAUNTON; 1936: A. A. THOMAS; 1937: R. H. GOLDSMITH, JOHN LOWE, 3d; 1938: F. R. KLAUCK; 1939: HENDRIK CORNELISSEN, G. G. KUBO, F. G. LEHMAN; 1940: J. B. SCALZI; 1941: C. L. HALL, JR.; 1944: T. W. LAMBE, M. W. MEYER, JR.; 1945: S. E. DUFF, 2d, S. H. HAYBROOK; 1946: R. F. LATHLAEN; 1948: W. H. GUMPERTZ, F. L. PARKER; Staff: C. N. SAWYER.

Interesting Miscellany

ROYAL BARRY WILLS'18, because "he has achieved outstanding recognition for his designs of residential construction throughout our country," was awarded a Certificate of Honor by the Massachusetts State Association of Architects at its annual meeting in January.

ERNEST H. HUNTRESS'20 wrote "Trends in Classifying Chemical Information," which appears in *Chemical and Engineering News*, Volume 27, January 10, 1949. He is also the author of "Centennials, Sesquicentennials and Bicentennials of Chemical Interest During 1949," which was printed in the *Proceedings of the American Academy of Arts and Sciences*, Volume 77, January, 1949.

MORROUGH P. O'BRIEN'25 discussed "The Nature of Industrial Research and Development" at the Northern California Research Conference on January 12.

JOHN STACK'28 is one of three men to share the award of the Collier Trophy, America's highest aeronautical honor. The Trophy was presented by President Truman on December 17. Mr. Stack shares in this award "for pioneering research to determine the physical laws affecting supersonic flight and for his conception of transonic research airplanes."

DORIAN SHAININ'36 presented a paper on "Statistical Inspection Pictures Cut Material Procurement Costs" at the annual meeting of the American Society of Mechanical Engineers held November 29 through December 3, 1948, in New York, N.Y. His paper, "Cost Cutting Chance Laws Can Control Design Tolerances," was presented at the annual meeting of the Society of Automotive Engineers held January 10 through 14 in Detroit, Mich.

LEONARD I. SCHIFF'37 is the author of *Quantum Mechanics*, published by the McGraw-Hill Book Company as a volume in its "International Series in Pure and Applied Physics."

The following Alumni contributed to the technical papers program at the 1949 National Convention of the Institute of Radio Engineers held on March 7, 1949: ERNST A. GUILLEMIN'24, ARTHUR L. SAMUEL'25, LEE MCCANNE'27, CLAUDE SHANNON'40, ALAN B. MACNEE'42, JOHN W. SHEETZ'42 in collaboration with KURT S. LION, Staff, and WILLIAM R. THURSTON, Jr., '43.

Obituary

HENRY RICHARDS'71, January 26.
THEODORE W. ROBINSON'84, December 30.

FRED A. WHITNEY'86, March 15.
ALBERT R. PIERCE'91, in December, 1948.*

JOSEPH M. VANCE'91, December 14.*
MARVINE GORHAM'93, December 21.*
OREN E. PARKS'93, July 4, 1947.
EDWARD B. READ'93, November 3.*
JAMES H. REED'93, February 13, 1948.*
ALICE MACOMBER GREENWOOD'95, in 1945.

ALBERT E. CLUETT'96, January 3.*
HENRY A. CLARK'97, January 9.
JAMES L. FYFE'97, January 21.
ALEXANDER H. NELSON'97, November 21.*

BERTRAM C. RANSOME'97, June 30.
GEORGE W. BROWN'99, December 20.*
GEORGE R. HECKLE'99, January 16.
JOSEPH E. LEWIS'99, November 30.*
AMOS A. LAWRENCE'99, November 14.*
JOHN MAGEE'99, February 8, 1948.*
DAVID C. MILLS'99, November 1.*
FRANCIS M. STANWOOD, JR., '99, January 20.

JAMES L. LITTLE'00, December 16.
HENRY B. BARRY'02, June 25, 1947.*
CARL GEILFUSS'02, August 24.
FRANK H. MASON'02, December 17.*
RODERICK J. MACGREGOR'03, November 3.*

JOHN H. DRAPER'04, December 18.
CARL H. GRAESSER'05, December 18.*
KENNETH O. MAJOR'07, November 29.*
REGINALD L. JONES'09, January 14.*
DONALD V. WILLIAMSON'10, December 30.*

WALTER H. HILDEBRAND'11, November 8.

BOYD DUDLEY, JR., '12, December 2.*
CLARK F. HIGGINS'12, December 9.*
ALBERT L. PASHEK'12, October 26.
TENNEY L. DAVIS'13, January 25.
CHARLES R. HILL'13, December 1.
JOSEPH A. TENNANT'13, December 14.*
EDWIN C. LUCE, JR., '14, December 11.*
WALTER HAYNES'16, October 5.*
GEORGE J. MEAD'16, January 20.
NICHOLAS V. MUMFORD'16, July 7.*
RAYMOND F. GOUDEY'17, December 16.*
GEORGE P. GAIL'19, May 1.*

RAY POWERS'19, September 7.*
FRANCIS C. RANDLETT'20, December 10.*
GEORGE WALMSLEY'20, July 16.*
DWIGHT BALDWIN'21, January 7.
ROBERT E. BEARD'21, December 22.

JOSEPH M. LURIE'21, January 1.*
CHESTER R. PAINTER'21, November 6.*
COLBY W. BRYDEN'22, January 11.*
LAURA HOLLAND DIXON'22, June 23.
HAROLD R. TEN EYCK'22, December 4.*
ELLIOT P. REXFORD'26, October 16.*
LINDSAY K. GENTRY'28, date unknown.
FREDERICK MILLER'29, April 6.
CARLTON G. NORTON'29, November 19.
FREDERIC F. HAYLEY'34, December 14.
H. CLARE HORWOOD'34, October 30.*

* Mentioned in class notes.

News FROM THE Clubs AND Classes

CLUB NOTES

M.I.T. Association of Cleveland

It has become a tradition among the Alumni of Cleveland to hold a meeting during the Christmas holidays and to invite to that meeting the many current students who have been able to return home for the holidays. Such a meeting was held this year as a luncheon at the University Club. From all indications this was the finest of all our student luncheons and encouraged those Alumni present to rate the student meeting as possibly the most important of those which are scheduled for the regular year. Some graduates never do get to their first meeting because they do not realize the worth of their regular attendance. Having been feted during student days there is probably a good correlation between that meeting and the frequency of future attendance. President Bill Loesch'21 turned over the reins of this meeting to Executive Vice-president George Merryweather'34. Those present were: W. P. Chandler'52, Taylor Craig'49, Richard Hare'51, Jerry Hathaway'52, Howard Hendershott'49, Warren Hill'50, Alfred Hofstatter'52, C. R. Houska'51, Lou Lehmann'50, Bill LeLievre'49, George Loomis'49, Phil Skove'49, Bill Tobocman'50, Bob Trenn'52, Tom Weil'49, Curtis Williams, Graduate, Bill Zimmerman'48, A. Ilsley Bradley'21, E. H. deConingh'25, Win de Raismes'37, W. H. Dolben'30, Walt Ericsson'47, H. P. Ferguson'27, R. F. Flood'35, Fred Folberth'48, Lew Fykse'41, Paul Heilman'44, Erling Helland'40, C. E. Herrstrom'24, R. B. Jewett'34, John Kellogg'48, Bill Krutzsch'48, Bill Loesch'21, By Lutman'47, V. W. McDaniel'29, M. G. Magnuson, Jr., '39, Bill Maley'48, G. E. Merryweather'34, Jim Neff'47, Jim Phillips'47, Jack Scalzi'40, Frank Schreiner'26, Bill Sessions'26, Charlie Smith'42, Doc Smith'23, E. E. Staples'26, L. C. Turnock, Jr., '41, R. H. Valentine'33, Edgar Weil'13, Frank Wood'22, Art Zimmerman'37. — G. RICHARD YOUNG'37, *Secretary*, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

M.I.T. Club of Milwaukee

The Club entertained M.I.T. students from the Milwaukee area at a luncheon at the University Club during the Christmas holidays. Students present were: Herbert Arndt'51, Jack Arnow'50, Fred Beutler'49, Joseph Brodzik'52, Harold Bruce'51, Michael Estkowski, Graduate, Jan Peyrot'49, Herbert Voss'50, and Charles A. Whitney'51. Pat Miller'15, Dave Smith'31, Phil Cristal'17, Bill Mark'43, Charlie Sollenberger'44, Jack Ballard'35 and

Frank Briber'43 represented the Club. The luncheon provided the club members with an opportunity to meet future club members. A lively discussion, which followed the luncheon, gave some pointers on how alumni clubs can assist or benefit undergraduates. — CHARLES L. SOLLENBERGER'44, *Secretary*, 7260 West Center Street, Milwaukee, Wis.

The M.I.T. Club of New York

Your correspondent got caught between the Christmas rush and preparations for a short vacation in the deep South and apologizes for missing the closing date of our previous issue to give at least a brief account of our most successful banquet held at the Biltmore Hotel on December 7. Larry Davis'22 and his committee (the writer excluded) did a grand job of publicizing and staging the Compton, Killian'26, Dandrow'22 dinner, resulting in some 525 Alumni and wives putting in their appearance. Sam Reynolds'22, President of our Club, did a beautiful job in briefly summarizing our activities and the purpose of holding this affair. Dr. Compton and Jim Killian gave us some most interesting plans and developments of the Institute and made us feel very proud indeed of our alumni affiliation. Many of the members felt particularly pleased over Dr. Compton's successor and the fact that he is an alumnus of the Institute. I think that I can safely say that Dr. Killian has 100 per cent backing on the part of the New York Alumni. Large turnouts were had by the classes of '22, '24 and the more recent classes, such as '37 and '44. We were again favored by the attendance of Alfred P. Sloan'95 and Gerard Swope'95.

Among the December membership changes, we are glad to welcome as new members: Charles S. Blumenthal'44 of Andrews and Clark; Eugene C. Woestendiek'47 whose business connection we do not yet know; Summer Cruzen'26 of 220 Broadway; and Robert B. Wooster'39 of 37 East 56th Street. — Phil Warner'92 is now located in Columbus, Ohio, in care of C. A. P. Turner, 964 North High Street. Colby Bryden'22 appears to be back at 165 Broadway with DeLaval Separator Company. — Since our last report we have been notified of the passing of the following: J. H. Reed'93, R. E. Palmer'13, Dr. Y. Subba Row'26, George T. Gilman'23, William E. Haugaard'10, H. M. Palmer'18, E. L. Himmelman'06, S. M. Foster'18, and Peter White'36. — Our next meeting will be held on February 18 at which Horace Ford is to be our guest of honor. — WILLIAM W. QUARLES'24, *Secretary*, 330 West 42d Street, New York 18, N.Y.

M.I.T. Club of Northern California

The winter dinner meeting of the Club was held on January 11 in the seagoing

atmosphere of the St. Francis Yacht Club in the shadow of the Golden Gate. About 50 faithful Alumni braved the cold to hear our guest, Executive Vice-president of the Alumni Association, but better known to the younger generation as Dean Lobdell. Alumni present welcomed news from Cambridge, particularly the latest developments on the library, senior house, apartment house for staff, financing and endowment, and what happened at the Harvard-Yale game. Secretary Bert O. Summers'34 gave an oral report of the Club's finances. President Henning J. Berg'15 requested the members to give thought to the promotion of an all-round club program and to give consideration to other activities besides luncheon and dinner meetings. Plant trips and family affairs such as picnics and swim parties were suggested. He also reminded members of the informal weekly luncheons held every Tuesday at noon on the mezzanine floor of the New Delmonico Restaurant, 328 Sutter Street, San Francisco. Luncheon prices are reasonable; the meal is plentiful and good. All Alumni are welcome and no reservation is necessary.

Those signing the register were: Aubrey Ames'19, Henning Berg'15, Earle Brown'15, David Brown'40, Stan Bryan'48, Harold Chapman'22, R. S. Clark'06, A. B. Court'10, S. T. Davenport'48, L. R. Davis'07, Dave G. Edwards'42, Carl Engstrom'36, R. C. Fellows'16, Malcolm H. Finley'24, Donald S. Floyd'48, H. S. Gardner'30, Ledyard Hale'48, James L. Hall'41, John K. Heller'16, B. V. Hettich'43, G. B. Hulett'34, Dwight Johns'22, Fred Johnson'34, William Kaesche'44, Herbert Kaewert'47, Raymond Keyes'40, Floyd Kreuze'47, R. A. Lazarus'41, J. H. Lensch'30, Carl McGinnis'42, John E. Manley of the M.I.T. Development Program, 111 Sutter Street, San Francisco, Henry Pohnedorf'41, Alexander Poskus'41, Charles Price, Jr., '36, Jack Nichols'22, Fred Noonan'40, E. J. Riley'09, John Rittenhouse'40, Joe Seligman'34, George Sibbett'03, J. A. Stern'41, E. H. Stewart, Jr., '43, Bert O. Summers'34, F. A. Tusler'23, David Walton'48, Walter G. Wells'43, John Whelan, Jr., '42, George Whittle'08, H. M. Zeidler'43. — BERT O. SUMMERS'34, *Secretary*, 1740 Broadway, San Francisco, Calif. RAYMOND E. KEYES'40, *Assistant Secretary*, 3006 Colby Street, Berkeley 5, Calif.

M.I.T. Club of Northern New Jersey

The first Smoker of the 1949 season was held on Tuesday, January 11 at the Hotel Suburban, East Orange. Over 150 Alumni residing in, or near, the Northern New Jersey area attended. The meeting was preceded by a dinner for those who wanted to eat downtown, and approximately 75 men took advantage of this opportunity to break bread with classmates

and old friends. At the Smoker, the featured speaker was Sumner Pike, member of the Atomic Energy Commission, who spoke on "Atomic Energy." For well over an hour, Mr. Pike held his large audience in rapt attention, as he painted a fascinating picture of progress and problems connected with current atomic research. His talk was of especial timeliness and heightened interest because after fully covering the military side of the picture, he went on to fully present a summary of the important and peaceful power applications of atomic energy, on which research is now beginning to be focused. Mr. Pike was introduced by Dobey Keith '22, who is president of Hydrocarbon Research, Inc., and who, during the War, was intimately associated with atomic research in his capacity as vice-president and technical director of Kellogg Corporation. Mr. Keith displayed several maps illustrating the worldwide scope of the Atomic Energy Commission's activities and responsibilities.

The Class of '22 was further represented at the Smoker by the presence of George Dandrow '22, President of the M.I.T. Alumni Association, and of our own Clate Grover '22, who is giving the M.I.T. Club of Northern New Jersey a vigorous and valuable administration in his capacity as president. A firm indication of this was afforded by a report, made at the Smoker, that the club treasury remains in a highly solvent condition, reflecting the interest of the club's membership as expressed by the large number of \$10.00 "blanket" advance dues payments, which entitle the member to attend all club functions with no additional charge. — As a further highlight to the Smoker, program chairman Ed Asch '34 arranged with the Army to show two official films, "A Tale of Two Cities" and "Operation Crossroads." The next Smoker will be held in the latter part of March. — FLETCHER P. THORNTON, Jr., '36, *Secretary*, 1 Primrose Place, Summit, N.J.

The M.I.T. Club of Tulsa

The 1948-1949 season opened with a luncheon on November 15 at Smith's Restaurant which was attended by 27 Alumni. It was decided to hold one meeting a month, either luncheon or dinner, as close to the first Wednesday of the month as convenient, subject to change by the executive committee to suit the general convenience. Because of the holiday season, the next meeting was scheduled as a luncheon on January 12. This luncheon at Smith's Restaurant was attended by 21 Alumni in spite of an unseasonable snow and sleet storm. President Silverman advised the membership that Harold E. Lobdell '17 would be in Tulsa on February 16, and the group voted to hold the next meeting as a dinner and social hour with Mr. Lobdell on that date. — WALTER S. SMITH '30, *Secretary*, 410 McBirney Building, Tulsa 3, Okla.

The M.I.T. Club of Quebec

The Club had its second meeting of the year 1948-1949 on December 2, 1948, at the Queen's Hotel, in Montreal. Erwin H.

Remember, June 11 is the time —

Schell '12, head of the Department of Business and Engineering Administration at the Institute, gave us a most inspiring talk entitled, "New Measures of Success," in which he drew a parallel between business management and self-management.

The following Alumni attended: H. A. Audet '45, Q. R. Ball '46, C. P. Beaubien '34, T. L. Brock '38, W. G. Dodge '31, E. J. Fournier '31, L. A. Fraikin '31, H. Gaudet '34, M. Gerin '21, E. N. Gougeon '25, S. J. Hungerford '33, J. Hurtubise (summer session '34), H. N. Karr '34, E. Langevin '30, Jacques Laurence '40, G. K. Marshall '41, Huet Massue '15, F. D. Mathias '36, J. C. Merritt '16, R. D. Packard '26, W. J. Pead, Jr., '11, H. C. Pearson '23, J. M. Raymond '34, A. D. Ross '22, G. E. Rousseau '25, M. G. Royer '26, Rene Simard '28, A. T. E. Smith '21, J. N. Stephenson '09, G. L. White '23, and three guests: I. Brouillet, C. E. Tourigny and M. Landry. — JACQUES R. LAURENCE '40, *Secretary*, 1430 St. Denis Street, Montreal 18, P.Q., Canada.

CLASS NOTES

• 1886 •

The Secretary of M.I.T. '86 has but little to tell concerning the doings of the living members of the Class and as today is the last date to get a word or two into the March issue of *The Review* he must step lively!

Roland Gamwell, our first, and as far as the Secretary knows, our only President, writes from his home in Bellingham, Wash., under date of January 3 acknowledging the receipt of a Christmas card from Island Creek. He spent the holiday at his daughter's house in Vancouver, B.C., some 50 miles of a fine scenic highway from Bellingham. The Secretary well remembers how, on one of his numerous visits to the home of his daughter and twin granddaughters in Seattle, Wash., she drove him to Bellingham and called on Roland finding him at work in his rose garden. The sad note in Gamwell's short letter is his mention of the death of his wife, though he does not give the date. He writes: "Since my wife died, I am living alone; not even a servant. But the guest rooms are in commission and the larder kept capable."

A Christmas card was received also from Harry Clifford who promises that he will send a few lines about himself shortly. Jim Duff also sent me a card and a Merry Christmas but no news. No one seems to know of the present address of Fred Perkins, VI, for which I asked a while ago. — ARTHUR T. CHASE, *Secretary*, Post Office Box 4, Island Creek, Mass.

• 1888 •

The Fitchburg *Sentinel* of November 10 is the source of the following information regarding one of our classmates: "Charles Henry Putnam, 80, retired official of the Great Northern Railroad, and a son

of the late Mr. and Mrs. Henry O. Putnam of this city, died recently in St. Paul, Minn. . . . Mr. Putnam was born in this city Sept. 14, 1868. He received his advanced education at . . . Technology after which he entered the employ of the Putnam Machine Co., owned by his father, and worked in the drafting department for 10 years. He left Fitchburg for St. Paul, Minn., where he entered the employ of the Great Northern Railroad, and later was transferred to their plant at Great Falls, Mont., where he was superintendent and then was shop superintendent for 20 years at Spokane, Wash., returning to St. Paul in 1921 to become master car builder for the company which position he held up to the time of his retirement in 1937. He had been in ill health for the past three years. He is survived by his wife, Mrs. Mary (Clark) Putnam; a daughter, Mrs. James L. Holman; a son, Henry H. Putnam and four grandchildren; all of St. Paul, Minn., and a brother, George Rufus Putnam of Westminster."

William Atkinson has moved from Boxford, Mass., to 109 Spruce Street, Watertown, Mass. — The following is taken from the Boston *Globe* of September 25: "Walter I. Towne, 85, of 51 Warren St., former first assistant electrical engineer of the New England Telephone and Telegraph Company, died last night at his home. A native of Topsfield, Mr. Towne had lived in Medford for 48 years. He was a graduate of . . . Technology . . . , a member of the Telephone Pioneers and Mt. Vernon Lodge, Odd Fellows. He leaves a wife, Amy A. (Smart); a son, Walter M., of Saco, Me.; two daughters, Mrs. Everett H. Barnard and Miss Barbara Towne, both of Medford; and a sister, Mrs. Sidney C. Gould of Wenham. There are three grandchildren and three great grandchildren. . . . Your Assistant Secretary, Sanford Thompson, writes that he is spending a part of the winter with his wife in Phoenix, Ariz. Before starting they subscribed to membership in the American Automobile Association and found their literature a wonderful guide. This not only as to routes, but to hotels and motor courts, all the way from New England to Arizona. Good overnight stopping places could be figured in advance so as never to go astray. In starting their trip they were just ahead of the 18-inch December snowfall in New York City and after a pleasant Christmas in Atlanta, Ga., and a fine drive through Texas, arrived in Arizona a day ahead of the first unprecedented fall of snow that blocked the roads with ice a few miles east of Tucson. As he writes, in January, he is living in hopes of the wonderful sunny weather for which the country is celebrated. — Johnny Runkle, we have heard, spent a few weeks in California in December. — BERTRAND R. T. COLLINS, *Secretary*, 291 Nassau Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

• 1891 •

Another of our members, Albert R. Pierce, passed on at New Bedford, Mass.,

on December 9, 1948. Always interested in class affairs, he has attended various reunions including our 50th. He was a gentleman of the old school, born and brought up in New Bedford, and well known in the textile industry. The following are extracts from a local paper: "Mr. Pierce was the originator and designer of the cotton airplane wing fabric which replaced the linen material used in World War I. For his work in developing the fabric, he received a Presidential Citation. The fabric was developed at the Pierce Manufacturing Corporation here. Member of a family long identified with the industrial history of New Bedford, Mr. Pierce was associated also for many years with his brothers, Andrew G. Pierce, Jr. and the late Edward Taber Pierce, in operation of Pierce Brothers, Ltd. here. He was a director of the Merchants National Bank, the New Bedford Five Cents Savings Bank, the New Bedford Institution for Savings, and the Union Street Railway Company. After attending public schools and Friends Academy here, he studied at . . . Technology. . . . Following his graduation, he entered the mill business at the Pierce Manufacturing Company where his father, the late Mayor Pierce, was treasurer for many years. Mr. Pierce was affiliated with the textile firm as agent and superintendent and was active in the business until its liquidation about 27 years ago. Long active in the New Bedford Yacht Club, Mr. Pierce was a past director and a few years ago was voted an honorary membership. He also was a member of the New Bedford Cotton Manufacturers Association, past president of the Technology Club of New Bedford, a member of the New Bedford Port Society and the Wamsutta Club. A son, Albert R. Pierce, Jr., who went to M.I.T. [31], and four grandsons survive him."

F. A. Spaulding '98 of Pittsfield, Mass., reports to us the death of Joseph McArthur Vance, IV, in that city on December 14, 1948. His card to us reads in part as follows: "He was born in Urbana, Ohio, on January 22, 1868, son of Joseph Colville Vance, and came to Pittsfield on December 10, 1894, to superintend the construction of the Berkshire County Savings Bank Building, and has remained in Pittsfield ever since. He is survived by his wife, Grace Frances Hersey, whom he married in Gardiner, Maine, in 1899, and one son, Joseph Colville Vance of Pittsfield." A local newspaper has a long account of his activities, from which the following is quoted: "He moved at a young age with his family to Chattanooga, Tenn., where he was brought up. He later returned to Urbana where he was a graduate of Urbana University. He played on the varsity baseball team, and was a pitcher and had the great distinction of hurling a no-hit, no-run game for his alma mater. He came East to study at . . . Technology. . . . Among the local buildings for which Mr. Vance had been architect are the Registry of Deeds Building, the First Baptist Church and First Church of Christ Scientist, Colonial Theatre, and the old Majestic Theatre which is now the Palace, Masonic Temple and the Old Aspinwall Hotel in Lenox. Mr. Vance was an outstanding golfer in the Berkshires

in his day. He was a member of the Country Club of Pittsfield and once won the county golf championship. Baseball was one of his principal sports and for two years he was president of the Pittsfield Baseball Club of the Eastern League." — In a recent letter, Arthur W. Pierce of Pittsfield mentions the death of Albert Pierce and Joseph Vance. He says the latter's death leaves only three nineteenth century M.I.T. men in Pittsfield; Pomeroy W. Power '85, Charles W. Power '89 and himself. Dippy, in freshman French, always mixed up the two Pierces, Albert and Arthur. Arthur had a session with the hospital last summer, but started riding his bicycle again in September, "now as good as new" (Arthur, not the bicycle).

The sympathies of the Class are extended to our President, Harry Young, on the death of his wife (nee Hoxie) in Boston on December 16. As many of you may remember, their daughter was the class baby, now a grandmother, and she still cherishes the Cap presented to her by the Class at that time. — F. Clouston Moore is spending the winter, as usual, at the Arizona Inn, Tucson, Ariz. — One of the most interesting greeting cards ever received was from Frank Howard. The photograph showed Frank at ease in his big chair by the fireplace (incidentally a good picture of Frank) and labeled, The Winchester Kiva. An accompanying note reads as follows: "A Kiva is an underground chamber in which the western Indians hold the secret ceremonies by which they control the rain, weather, crops, and so on, and also secure success in war, hunting and other enterprises. Braves only are admitted — no squaws. The Winchester Kiva is the 'new look' in Kivas. It is underground, as are all Kivas, in the cellar. It is entered by a steep stair instead of a ladder and is distinctly modernized from a Kiva point of view. A picture of the Great Spirit of the American Indian is displayed on the wall, and the fireplace is a distinct innovation. Squaws are admitted in the Winchester Kiva under a special dispensation from the Great Spirit; but only after being qualified by a solemn oath and a prescribed initiation. Several squaws have survived and are in good standing."

That '91 men do contact each other at times is again proven by a letter from Ed Smith, which resulted in a letter from him to Robert Ball in England regarding a book entitled, *Qualities in Cotton*. There was confusion in names, but several letters resulted, both being good at letter writing. A few extracts from Ball's letters are of special interest: "If all the various occupations of members of our Class were chronicled, what an interesting cyclopedia would result. They would be a representative section of the industries and scientific advances of the country for the last half century. Both our countries are suffering from much the same cause though with different intensity. Those who know, as I do, the wonderful generosity and helpfulness of your country cannot but feel a deep debt of gratitude. The good book tells us about the virtue of casting bread upon the water and I hope that it will return to you as foretold. We are doing our best to help, I hope, and would do better

if we were not frittering away our time and substance on party politics. But there is a kick in the old horse yet; you will see. The lovely spots I have visited in your New England are no doubt the reason for caution in tearing down and rebuilding. We have a Cambridge Preservation Society here for the purpose of preventing spoilation. My wife was very touched by the attitude of Mrs. Smith which so closely accords with her own, and mine, for she reverences all the wonderful historical memorials around us and would like them to be left for posterity. Did you get much out of the lectures we used to attend at Technology on economics? Remember, we had as president one of the great economists then living but our lectures were given, if I remember rightly, by Dr. Dewey. The subject was left more or less 'in the air' in my mind and unlike, as you write, the elastic limit of metals, there was nothing precise about it and the intervening years have left it much in the same position." Ed Smith made this comment concerning the last paragraph: "According to my recollection, it was Dr. Dewey who played the economics harp and, like Ball, I was left 'up in the air.' Wasn't it Carlyle who dubbed economics the 'dismal science'? That's the way I used to feel about it, but now wish that I had 'applied my heart unto wisdom' (economic wisdom) so that I might understand some of the Washington wrangling." — HENRY A. FISKE, Secretary, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

• 1893 •

Edward Burrell Read, who was a member of our Class during the freshman year, died of a heart attack at the Masonic Home in Utica, N.Y., on November 3, 1948. On leaving the Institute, he went into the furniture manufacturing business with his father in Boston. Following employment as a general secretary with the Young Men's Christian Association from 1896 to 1900, he returned to the business of manufacturing furniture in a factory owned by his father in Richford, Vt. He also managed a factory in New York and owned another factory in Maryland. For a time, he was associated with Camp Abnaki and the Burlington Boys' Club where he taught woodworking to the boys. He was a deacon in the Old Cambridge Baptist Church and later in the Burlington Baptist Church. He had retired from business in Burlington about six years ago. He is survived by two married sisters and a grandson who is a student at Yale University.

Marvine Gorham, who was unable to attend our 55th anniversary class reunion because of illness, died at his home in Buffalo, N.Y., on December 21, 1948. Ever since graduation he had taken an active interest in the affairs of our Class and the Institute, having served as an Honorary Secretary of the Institute in the Buffalo district over a period of 15 years, a position which he found it advisable to resign last July. His business connections included two years with Yale and Towne Manufacturing Company; seven years with the Buffalo Bolt Company, during which time he made two trips to Europe for the company; one year with the Michi-

gan Bolt Nut Company; six years with the C. C. Wormer Machinery Company; and finally district manager for the Michigan Steel Casting Company of Detroit until the time of his death. His son, Marvin, Jr., graduated from the Institute in 1936 and is now sales engineer for the Buffalo Forge Company in Los Angeles, Calif.

James Henry Reed, whose latest home address was 160 East 48th Street, New York, died on February 13, 1948. Since graduation with our Class as an electrical engineer, and until the time of his retirement in 1932, he had been engaged as treasurer and sole owner of the National Machine and Tool Company, manufacturers of special machinery. During World War I his business was greatly expanded to provide machine tools for ordnance work and the manufacture of ordnance parts. He had been a member of the Exchange Club, the University Club of Boston, Brookline Country Club and the Boston Athletic Association. — FREDERIC H. KEYES, *Secretary*, Room 5-213, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston 16, Mass.

• 1895 •

A letter received from Marjorie Reid McManus states that her father passed away recently. James Thomas Reid McManus was graduated from Course I. When details of his passing have been received, they will be recorded. His home was in Moncton, New Brunswick. — Walter A. Hall who lived in Swampscott, Mass., for many years has moved to Samoset Road, Eastham, Mass. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

• 1896 •

We wish to acknowledge the messages of sympathy received from several classes in memory of Charles Locke. — Fred Damon has accepted the pro tem appointment of Assistant Secretary. It will divide the responsibility of this office and his acceptance is much appreciated.

We have received notice of the death of our classmate, Albert E. Cluett, on January 3. On behalf of his mother and brothers, Edmund Cluett wrote to the Secretary in part as follows: "Each day Dad would look forward to his mail because he knew he would receive a letter from one of his dear friends. I know you will be happy to know he did not suffer and when he passed on . . . he entered quietly into blessed peace." Will Coolidge very kindly forwarded some newspaper clippings and wrote the Secretary that he and Dorothy had attended the funeral. The following is quoted from the New York *Herald Tribune*: "Albert E. Cluett, seventy-six, chairman of the board of the Troy Saving Bank . . . died . . . after a long illness. Mr. Cluett formerly was secretary and a vice-president of Cluett, Peabody & Company, Inc., shirt manufacturers. . . . He resigned his executive position in 1927. . . . He was a director of the Delaware & Hudson Railroad Corporation, and of the Peterson & Packer

Coal Company of Troy. He formerly was a trustee of the Rensselaer Polytechnic Institute and Emma Willard School. He was a member of the University Club of New York, St. Anthony Club of Boston, Schuyler Meadows Club of Albany, the Troy Country Club and the American Society of Mechanical Engineers. Surviving are his wife and four sons and a brother, Sanford L. Cluett, of Troy. . . ."

Address changes include: John Ashton, 10 Buckingham Road, North Andover, Mass.; H. B. Hartwell, 283 Vinton Street, Melrose 76, Mass.; and R. D. Flood, 645 North Wabash Avenue, Chicago, Ill. — JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington, Mass.

• 1897 •

Alexander H. Nelson, I, died on November 21, 1948, in Atlantic City, N.J., aged 74 years. Mr. Nelson was born in Chambersburg, Pa., graduated from Chambersburg Academy in 1891 and from Princeton University in 1895. Coming to the Institute he became affiliated with our Class. After leaving the Institute he worked for 10 years in Pittsburgh doing designing and construction work. Going to Atlantic City in 1907, he served as assistant county engineer, later becoming county engineer, from which position he retired in 1947. For six years he was on the engineering staff of the South Jersey Transit Commission. He was an organizer of the Penn Hall School for Girls in Chambersburg, and served as president of the board. For a number of years he was president of the Chambersburg Hosiery Company. He was a member of the Princeton Engineering Society and the American Society of Civil Engineers. He resided at the Marlborough-Blenheim Hotel in Atlantic City. He leaves his wife, one son and one daughter. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

• 1898 •

At the Golden Anniversary it was interesting to learn that many of our classmates were back to the Institute for the first time since graduation; and how astonished they were at the growth in the past 50 years; and how insistent that they be kept informed in the future of Class and Institute doings. This last behest has been answered in a very simple way. It has been arranged, as you have already been informed by President Van Rensselaer Lansingh, that in the future all the members of the Class will receive *The Review*, in which are mirrored the doings of M.I.T. By a singular appropriateness, the first number of *The Review* to be sent to all the members of the Class was the issue of January, 1949, the 50th anniversary of its publication. Two articles in this issue merit special attention: "Fifty Years Before The Masthead," the record of *The Review's* progress for five decades by H. E. Lobdell '17, Executive Vice-president of the Alumni Association; and "Funding M.I.T.'s Independence," by the new President of M.I.T., Dr. James R.

Killian, Jr., '26. The issues of *The Review* will keep you abreast of the epoch-making doings at M.I.T. Now how about the doings of '98? Well, that is a little more difficult, but your officers are grappling with the problem.

What do you think of the new '98 paper that Van has designed and what do you think of his first Presidential message? We are writing this copy before the paper has been printed or the letter sent out; but you'll be delighted. Van is right on the job and we must back him up. You will note from the paper and also from the '98 notes of February the organizational setup of '98 to date. We can't all be officers, of course, but there is something for each and all of us to do. Remember the Fiftieth! Remember that Lester appointed all manner of subcommittees all over the land and remember how they worked. Well, we can follow this successful example. How many subcommittees do you think we should have between reunions? One subcommittee we can think of is an editorial committee. We now have an Assistant Secretary, Joe Riley, and there are many writers in the Class who can gather and help edit class notes. More about this later.

Have you seen the Wright Brothers commemorative issue of *Collier's*, December 25, 1948, of which mention was made in the February notes? This issue, of which our Lester was godfather, and on which he labored with his usual concentration and effectiveness, gives a surprisingly concise and comprehensive story of American aviation. There is an article by Lester, "The World The Kitty Hawk Made," a picture of the Kitty Hawk Plane, the diary by Orville Wright of the first flight, and numerous other articles, fully illustrated, concerning the past and present of aviation and prophecies for the future.

We are in entire accord with the following letter from Elliot Barker: "The enclosed little story about one of our classmates is something that should be added to the annals of our Class. The story is entirely true and I have verified some details recently. I think we should be proud of our classmate, in fact it is such a rare case that all Technology should be glad of his example. In retrospect. Our recent Golden Anniversary brought us together from far and near to renew old friendships, make new friends, recall our school days of 50 years ago and in many instances to hear human interest tales almost forgotten. I recall the story of John Brown Dixon, whose life at Technology should be recorded as an illustration of high sterling character and success. He confided in me and told the essential parts of this story.

"He came from Washington, D.C., in the early fall of 1894 with just enough money and educational preparation from Howard University to enter the freshman class. He was quiet, industrious and unassuming. In both heart and mind, the ambition to succeed burned with a wonderful glow. 'Still waters run deep' aptly applied to him. The family was large, the pocketbook small, the parentage a mixture of races in which determination and self-

reliance were the only known paths to the better and fuller life. His arrival in Boston was a major event. Technology was there, and through it lay the bright future. The problems were many; how to live, how to eat and sleep, how to get tuition of \$200 per year plus books and lab fees. No one knew if John had scholarship aid, for his pride and modesty forbid discussion of these intimate personal affairs, but we did learn that he found janitor work with some of the Back Bay families. Perhaps he slept and studied near the furnace where he could obtain a small measure of comfort, and much of the time he received handouts from the maids as food. At times, however, this precarious method of life left John too hungry for comfort and he knew of a restaurant in Park Square where he could buy a plate of beans and brown bread with a cup of coffee for 15 cents. These meals were high spots in his life and he spoke of them with great relish.

"As a scholar he rated fair, usually passing the exams with average marks, rarely flunking. He absorbed all the knowledge possible, made the most of his haphazard mode of life and continued to live in Boston, winter and summer, for the full four years with never a visit to his old home in Washington. John had passed his final exams and he was notified that his degree would be awarded. Every chemist knew that the final breakage bill must be paid before he could receive his degree. John's bill was about \$40 and he had no money. The day after receipt of the bill he came into the laboratory where he had toiled for the greater part of four years, discouraged and crestfallen. It seemed as if his fondest dream was shattered. With great sadness and hesitation he confided his predicament to a classmate working opposite him. He could not graduate with '98. There were about 20 chemists in the class of '98 and \$2 was contributed by each. The next morning the money was given to John. Tears of joy came to his eyes and he graduated with us. The sequel. First as assistant chemist, then chemist, then superintendent, John was a success with the Glens Falls Portland Cement Company. He married Mabel Lewis of Lake George, N.Y., on April 19, 1913, and had a happy home in Glens Falls, N.Y. He passed on December 12, 1940, after 42 years of service, leaving a record of honesty, integrity, pluck and perseverance, unsurpassed by any alumnus. He was a great credit to M.I.T. and an honor to the Class of 1898. His Employer's Tribute. He was a great reader and as a result was not only a first-class manufacturing cement chemist but a widely educated man. He was highly respected by the management and employees of his company and he was greatly missed after his 42 years' service."

—EDWARD S. CHAPIN, *Secretary*, 463 Commercial Street, Boston 13, Mass.

• 1899 •

Clancey M. Lewis, III, of Renton, Wash., very pertinently asks your Secretary if the state of Washington is still a sovereign member of the United States. Looking into this inquiry, I find that in my geographical list of classmates pub-

lished in the December, 1948, issue of this publication, the two Washington residents, Lewis and Matheson, II, were inadvertently credited to Washington, D.C. The figure for Washington, D.C., should be four instead of six, and the state of Washington two. Clancey writes on a letterhead of the Lewis Development Company, Clancey and Margaret Lewis, Proprietors, lots, acres and estates. Clancey resigned as secretary of the Manufacturers Association of Seattle, Wash., in 1942. As a hobby, he has a well-equipped shop on the lower level of his new farmhouse on which he says he was plumber, electrician and carpenter's helper. He has recently received word from the American Institute of Mining and Metallurgical Engineers, which will hold its annual banquet in San Francisco on February 16, 1949, that he has been nominated for membership in the Legionnaire, the requirements for which are 50 years of membership.

Since the last class notes were published, news has been received of the deaths of several classmates. George Winslow Brown, V, ill for the past year, died on December 20, 1948. George was chemist for the Assabet Mills, a subsidiary of the American Woolen Mills, located in Maynard, Mass., for more than 25 years. During World War II he was chemist for the Metcalf Mills, Wamskut Mill at Providence, R.I. After the War he was chemist for the Atlas Color and Chemical Company of Boston.

Joseph E. Lewis, II, President of Joseph E. Lewis and Company, Inc., precision tube bending and coiling specialists, died at his home in Baltimore, Md., after a prolonged illness, on November 30, 1948. After graduation Joseph went with the Whitford Coil Pipe Company of Hartford, Conn. He left them in 1911 to become manager of the Baltimore Tube Bending and Polishing Company. In 1913, Joseph founded the business which bears his name, producing coiling and bending equipment. Later, the firm extended the business into fabricating service for coil and tube bending to customer's specifications. In 1945, a tankless heater, the Aqua-heater, was devised and put on the market. Joseph is survived by Mrs. Lewis and two daughters, Miss Margaret Lewis and Mrs. Elmer L. Saunders.

Amos A. Lawrence, IV, died on November 14, 1948, in Antibes, France, according to the *Boston Herald* and the *New York Times*. Lawrence graduated from Harvard University in 1896 and then studied architecture at M.I.T. before entering Beaux Arts in Paris. After a year in an architect's office in New York City, Lawrence came back to Boston and established the firm of Lawrence and Wambolt. Lawrence was also an authority on antiques and for some time had an antique shop on Chestnut Street, Boston. During the last two years of World War I he was engaged in relief work with the French High Commission. —The Alumni Secretary's office reports the deaths of David C. Mills, IX, of Darien, Conn., on November 1, 1948, and of John Magee, II, of Greenwich, Conn., on February 8, 1948. Your Secretary will endeavor to obtain further details regarding these two classmates for a later issue.

Long before this number of *The Review* is delivered, each classmate will have received a letter relating to the 50th reunion, a bill for class dues (no class dues have been collected for the past 15 years) and a questionnaire. If you have not already replied, please do so at once. —BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. MILES S. RICHMOND, *Assistant Secretary*, 201 Devonshire Street, Boston, Mass.

• 1900 •

In the November, 1947, notes, a letter from Harry Morris told something of a trip that he and Dan Johnson made through Arizona and the Death Valley. Another letter from Morris to Ed Bugbee now continues this story. It reads in part as follows: "We went to Reno. I saw some old friends there and Dan took me to some of my old camps, where I would have felt at home if there had been anybody around. I shipped a Buick to Los Angeles from Washington, D.C. Mrs. Morris claimed it late in June and met me at Mojave where Dan took me down Owens Valley. Mrs. M. and I drove all over the southern map and finally took off for the north about the middle of August, stopping at Carmel, San Francisco, where I had not been for 30 years. We went up the coast to get in some salmon fishing but could not even rent a boat, so we drove on to Tacoma and Seattle and visited some friends on one of the San Juan islands where I finally snagged the only salmon of the trip. Spent a night at Timberline Lodge on Hood and went down to Grants Pass again where I fished the Rogue for eighteen miles and saw a great many fish but not a strike.

"I had gotten the 'itch' again just before we started north and asked Dan if he would be interested in another trip to Tahoe and over the range to some of the old Mother Lode camps. Promptly, a map came back with various routes suggested. When the 'Boss' and I arrived back at San Francisco the first of October, her niece met her and they drove down to Santa Monica. I entrained for Reno to meet Dan and we went to Tahoe and down over the Kit Carson Pass to Jackson and south through Angels, Sonora, Columbia, and so forth, to the Yosemite, where we stayed just one day too long to get over Tioga Pass and see Mono Lake and down the Owens Valley again. Sixteen inches of snow on top, about nine thousand, was too much for the chief ranger and he would not let us go, so we had to drop down to Fresno and over to Mojave again, where I took a train for the coast. We sold the car there and came back here the last of October. I got another car in March and we drove 'around' Florida, stopping on the west coast to stay with my sister and her husband. We got back here in May and have been 'put' ever since. But I'm getting tired of it and had made plans to go to the west coast for the A.I.M.E. meeting but the election spoiled some deals, so I don't know yet; but I'd like to be out there to help my old friend, Bill Wrather, run the show. I'm still as active in the local section as they will let me be, and I'll get my but-

ton and scroll in 1952 if I survive death and taxes that long."

Speaking of Course III men, George Tweedy has changed his address from Los Angeles to Phoenix, Ariz., but Francis C. Lincoln has gone from Rapid City, S.D. to Chula Vista, Calif., so we still have a representative of this Course in Southern California. Warren Edson, II, gives a new address in Newtonville, Mass., but it seems that he is in Florida for the winter. In case any one wishes to call on him there, his address is 2212-9th Street North, St. Petersburg. Harris G. Hooper has changed his mailing address from Syracuse, N.Y., to 31 Crooke Avenue, Brooklyn 26, N.Y. — **ELBERT G. ALLEN, Secretary**, 54 Bonad Road, West Newton 65, Mass.

• 1902 •

Word has been received of the death on June 25, 1947, of Henry B. Barry, a colonel in the Quartermaster Corps, stationed at Richmond, Va. Barry left Technology after one year to enlist in the Army and saw three years' service in the Philippines. He was for a while engaged in the insurance business in Chelsea, Mass. He returned to the Army and in World War I was stationed in Boston in the Quartermaster Corps, with rank of captain, and later in Washington with the rank of lieutenant colonel as assistant chief, surplus property division. In 1921 he became a major in the permanent ranks and remained in the Quartermaster Corps, achieving the rank of colonel in 1939.

The Class has lost another member in the death of Frank H. Mason, chief engineer of the Central Maine Power Company in Augusta, Maine, on December 17, 1948, after a short illness. Mason was with the Class only one year, but he was always an interested and loyal alumnus. He obtained his engineering training and degree at Rensselaer Polytechnic Institute. After several minor positions in Massachusetts and New York he entered the employ of the Bar Harbor and Union River Water Power Company at Ellsworth, Maine, in 1906. In 1907 he was with the Fort Halifax Power Company at its Winslow station and the next year joined the Central Maine Power Company as chief engineer. Later, when the New England Public Company was organized, he became chief engineer of the holding company. During his 40 years of service, he had charge of the construction of many larger water power engineering projects throughout the state of Maine and also in New Hampshire and Vermont. He was a registered engineer in the states of Maine, New Hampshire, Vermont and New York and served on the first board of registration for the Maine Professional Engineers. He held membership in the American Society of Engineers, the American Institute of Electrical Engineers, the American Concrete Institute, the Boston Society of Engineers, and he was a past president of the Maine Association of Engineers. Mason is survived by his wife and a son, Captain Robert Childs Mason, Marblehead, Mass. — **BURTON G. PHILBRICK, Secretary**, 246 Stuart Street, Boston 16, Mass.

• 1903 •

Myron Clark, long active in labor-management relations, conducted a series of eight evening conferences at the Boston Young Men's Christian Association, through January and February, on the general subject of "Conference Leadership." We heard from Tom Sears and Hewitt Crosby during the past month. Both are planning to spend part of the winter in Florida, and plan to see each other there. Crosby's son is making a good recovery from an attack of polio. Since Hewitt retired from the Navy, he has been living at Thurmond, Md., about eight miles from Philip Rice, and sees him occasionally. Rice has recently returned from China where he was sent to survey damaged power stations and recommend methods of rehabilitation.

Too late for the January Review, we received news of the death of Roderick MacGregor, in Bangor, Maine, on November 3, 1948. Sears has kept in touch with him since 1903, and has sent us the following tribute: "Rod was well known especially by members of Course VI. Like many of us whose activities have taken us away from Boston much of the time, he has been unable to attend many of the Technology reunions. Nevertheless, he has always maintained a warm spot in his heart for the many friends he made while at the Institute. Following his graduation, he became active in the management of his father's spool mills in Maine and, with his father's failing health, he was soon in full charge of the John MacGregor Corporation operations. He brought to the management a keen insight into their problems and through improvements and inventions which he made, production was greatly accelerated with little increase in overhead expense. His responsibilities kept him so closely tied to his business that it wasn't until about 1915 that he and I were able to renew our friendship which so pleasantly began at M.I.T. From that time on we frequently traveled and hunted together to our mutual satisfaction and pleasure. He was a wonderful traveling companion and friend and, above all, a good sport. . . . He was quiet spoken and sympathetic and would often travel miles to bring aid and comfort to some less fortunate individual. Rod's outstanding hunting expedition was to Alaska in 1940. With a guide, his organization and an airplane, he flew to the interior of Alaska, establishing a base camp at Rainbow Lake. On that trip he shot numerous specimens of mountain sheep, caribou, grizzly bears and mountain goats and a large moose which scored second in the National Championship Awards for 1940 (western division).

After the sale of the John MacGregor Corporation to the Clark Thread Company, he became a director of the Merchants National Bank of Bangor and has taken active part in numerous financial drives, notably for the National War Fund, the Red Cross and Savings Bond Campaign. He was a member of the University Club of Boston and the Penobscot Valley Country Club. After making provision for his relatives, he provided generously for the Eastern Maine General

Hospital in Bangor, Maine, and for additions to the Lincoln Memorial Library, South Lincoln, Maine, which was originally built under his supervision and largely with his personal funds. In addition to the building, he has provided funds for the maintenance, upkeep and equipping of the library. . . . He was interested in the Boy Scouts and provided a fund available for the boys of Enfield and Lincoln to attend Boy Scout camps. Surviving him were two sisters, Mrs. Elizabeth M. Leadbetter and Mrs. Emily M. Scanlon (since deceased) and a nephew, Mr. John M. Scanlon, of Lincoln. Rod will be missed by many; nobody knows how many, since he so cleverly concealed his good deeds, but we do know his friends are legion. Rod's unassuming and loveable qualities totally devoid of any pretense made the world wherever he was, a pleasant place." — **FREDERIC A. EUSTIS, Secretary**, 131 State Street, Boston 9, Mass. **JAMES A. CUSHMAN, Assistant Secretary**, Box 103, South Wellfleet, Mass.

• 1905 •

One of the saddest things to chronicle at this time is the untimely death of Carl H. Graesser, II, at his home in Southport, Conn., on December 18. Carl died of suffocation after choking on a piece of meat. In answer to a letter attempting to express the sympathy of the Class, Betty writes that Carl had been in full robust health and was particularly happy as the Christmas season approached. Those of us who knew them best through contacts at recent reunions know what a shock this must have been. Carl's life was so full it is hard to write a proper obituary. After graduation he went with the International Silver Company, Wallingford, Conn., seven years later joining the Ashcroft Manufacturing Company, which later became part of Manning, Maxwell and Moore, Inc. At the time of his death he was vice-president in charge of engineering. In our Ten Year Book Carl wrote: "Well satisfied with the results of a technical training except that my experience leads me to believe that it should be preceded by or combined with an academic education, thereby helping to solve human problems with the same success that a technical man has in meeting material problems." How prophetic in the light of the expanded curriculum in human engineering at the Institute today. Besides his wife, Betty, Carl left a son, Foster Graesser of New York City, and a daughter, Barbara Graesser of Florida.

Warren K. Lewis, X, Doc, to you, is in again with the highest honors in the chemical field. On May 6 at the Chicago meeting of the American Institute of Chemists, Doc will receive the 1949 Gold Medal of the society in recognition of his administrative ability, leadership and success as a teacher. He is best known in the chemical industry for his research in the fields of petroleum and leather making. Last year he received the President's Medal for Merit for having organized the chemical engineering phases of an advisory committee to the Chemical Corps,

particularly in the solution of problems of gas masks, canister design, aerosol generators and filters.

T. Green, I, writes that he has three children, T., Jr., Margaret and Ann. T., Jr. graduated from M.I.T. in 1930; Margaret graduated from William Smith and is now in Wilmington, Del., as private secretary to one of the heads of the Dupont Company; Anna graduated from Wisconsin in 1936, is married and lives in Elma, N.Y. T., Jr., has three children, T., 3d, Robert and Elizabeth. Anna has one child, all children and grandchildren well and doing nicely. T. has a contracting business which has apparently produced sufficiently during all these years, but with no pension or retirement funds. T. is praying for old age to keep away from his door. All of this information came as a result of a questionnaire which your Secretary sent out to about 100 members (4 per cent replies to date) and T.'s effort is much appreciated.

The same to Alden Merrill, V, who writes: "First, I am in good health, considering this advanced age. Second, I am still working, and shall probably die in the harness. I am technical supervisor of the Buffalo branch of the American Brass Company, a subsidiary of Anaconda. To get in a plug, during World War II the whole American Brass Company was estimated to have produced enough brass and nonferrous alloys to cover the whole of Manhattan Island with a layer one-eighth of an inch thick. My son was a lieutenant, senior grade, in the Navy, and my son-in-law was in the Federal Bureau of Investigation through the 'late unpleasantness.' My son, John, now lives in Buffalo and has two boys, aged four and two. My daughter, Eleanor, has two girls, aged six and four and a boy aged two. They, also, live in Buffalo. Hub Kenway writes that his daughter now has two boys, which, with his son's two boys, give him a total of four grandchildren. He claims to be ahead of me, but I think that three boys and two girls outrank four boys. It is a debatable question."

Frank Payne, XIII, after discussing a business problem of mutual interest (pump packing), refers to his health in this way: "However, I do take some pills myself; I believe they are thyroid pills. As you know, out here in the middle west one has to see that he gets plenty of iodine and as long as sea food isn't very good out here, we have to improvise." Frank has made a huge success of metallic and fabric packings and mechanical seals. — Frank Carhart also breaks in with the news that he is partner in the firm of Jackson and Moreland, engineers, Boston. "No honors, no medals, no children, just plain work. No retirement, no infirmities, except that I can't indulge myself hydraulically as much as I used to." Frank's principal trouble is that he has to travel too much. He was in Japan a year ago on reparations, expects to be in Teheran soon in connection with the work Overseas Consultants, Inc., is doing for the Iranian Government; Jackson and Moreland being one of the eleven companies forming Overseas Consultants, Inc. Frank is a vice-president and director. He's also consulting engineer for the bond holders of the Puerto Rico Water

Resources Authority, which is the governmental agency operating all of the electrical facilities of the Island of Puerto Rico.

Louis Robbe, I, writes from the Gulf Stream Hotel at Lake Worth, Fla., that he and Sophie are spending the winter there. Harry Wentworth, is doing the same, also gaining strength at the Vinoy Park Hotel, St. Petersburg. Harry says that he is going from Florida to his favorite spot in Canada and hopes to be with us before our 45th. Dave Bridges sold his business last year and retired; perhaps to tennis, as he expects to reunite with us next June (Hadley beware). — Roy Allen writes to make up for lost time and account for his frequent changes of address: "During the War years I had a part in some \$95,000,000 of interesting mining and metallurgical construction in Arizona, Nevada, Cuba and South America. After the peace, I was assigned to look after the foreign defense plants, costing some \$45,000,000, until they were sold or otherwise disposed of. For more than a year now I have been with Wigton-Abbott Corporation, a live firm doing a large amount of engineering design and construction. Among other tasks I am now busy getting out the requisitions and to see that the materials arrive on time for a manufacturing building in the Pittsburgh district which will cover about 15 acres. We lost our only son 12 years ago; and have no children to report. For some little time I have been toying with the idea of quitting work in another two years, but the cost of living has seemed to go up faster than the retirement fund, so I refuse to make any predictions. Infirmities? None. And my good wife still more than tolerates me, which is a matter beyond understanding."

Ted Steel, VI, sends a very original Christmas card, as was one from the Ros Davises, which disclaims any idea of retiring. However, he encloses a transcript from his company's house organ *Pepcoman* (Potomac Electrical Power Company) giving a picture which shows that Ted is as young as his children says he acts. Here's a condensation: "Edward T. Steel, who, as Research Engineer, has headed our Research Department since he formed it soon after coming here in 1932, is a serious but pleasant man, deeply appreciative of his 'friendly acceptance in the PEPCo family' despite his late entrance. Although born in Manchester, Vermont, he was raised and educated in Philadelphia. He took a BS degree in Electrical Engineering at M.I.T. and then entered a division of Stone & Webster which managed a number of electric utilities. His first assignment was testing meters for a Stone & Webster managed firm in Puerto Rico, later earning a managerial position. After serving with the Savannah, Ga., electric company, he was transferred to the home office in Boston to work on rates, property valuation, and other management problems until 1924 when he became a division manager of Puget Sound Power & Light Co. In 1932 he was engaged to do special work in revising our residential rate schedule, later forming the rate research group now known as our Research Dept. For ten years he has been an active member of the Load Research Committee, Assoc. of Edi-

son Illuminating Cos. He is interested in flower gardening and reading, but is especially active in Friends' Meeting (Quakers) in their well-known efforts to promote world peace and to dissolve racial and social differences. He hopes to devote much of his time after retirement to Friends' Organizations. Mr. and Mrs. Steel have one son and one daughter and one grandchild. . . . He and Mrs. Steel, . . . now live at 4422 Lowell St., NW. . . ."

We have these changes of address: Edward A. Mead, VI, retired after many years with American Telephone and Telegraph Company in New York to Route 5, Gettysburg, Pa.; Arthur J. Manson, VI, moved from Pittsburgh to 539 West 34th Street, Houston, Texas. — It is possible that an informal 1905 reunion may be held in or around Miami or Tampa, Fla., the latter part of March. There are quite a number of '05 men living there temporarily or permanently. If you are to be there about March 25 or 26, let your Secretary know. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 69 Newbury Street, Boston 16, Mass.

• 1906 •

We have some material which will be of interest to classmates and it is submitted with the understanding that we are not guaranteeing to change from the bimonthly basis under which we have been operating to the monthly basis which will result when these notes are included in the March issue. The headline item at this time seems to be the appreciation dinner given H. E. Young upon his retirement as vice-president in charge of sales of the Northern States Power Company. The dinner was held in the ballroom of the Hotel Nicollet, Minneapolis, on October 26, when more than 250 of Young's friends in business and civic affairs attended to pay tribute to his contributions in developing industry and commerce throughout the upper Midwest. Among those at the head table and participating in the program of short talks were Governor Luther Youngdahl, Mayor Humphrey of Minneapolis and Mayor Delaney of St. Paul. Young was presented with an illuminated scroll on behalf of the Midwest Electrical Council, recounting his efforts in promoting a spirit of co-operation among all branches of the industry. He was also given a bronze plaque by the Governor on behalf of the industry and business men's committee which sponsored the dinner. For the purpose of the class notes we are quoting the writeup taken from the dinner program which appears under the title, "The Man We Honor Tonight": "H. E. (Cy) Young, the man we honor tonight upon his retirement from Northern States Power Company after 36 years of continued service, has become so prominently identified, locally as well as nationally, in the field of public service, that he needs no introduction to business and civic leaders in the community. Since coming to Minneapolis in 1913, he has been one of the guiding forces in the growth of an electric utility which, from small beginnings, has become the 12th largest in our country today. 'Cy' is a

native of Bristol, Maine, and after graduating from . . . Technology in 1906 with the degree of electrical engineer, he engaged in special development work for the American Telephone and Telegraph Company in New York. He next joined the Coast and Geodetic Service of the Government and was shortly transferred to Manila, P.I., where he was appointed chief electrician for that city. His ability to handle electrical problems brought his work to the attention of the Philippine Government which employed him to make a study of electrical rates, ordinances and street railway systems in various cities of the Orient. That work completed, he accepted the position of General Sales Manager for the Toronto Hydro Electric System. In January, 1913, he became affiliated with the electric utility in Minneapolis and has been successively, Manager of Power Sales and Sales Manager of the Minneapolis General Electric Company; General Sales Manager of the Northern States Power Company and in 1931 was elected Vice President in Charge of Sales. In addition to his company duties he has been active in the work of electrical trades associations, serving as director of the Edison Electric Institute for many years and as chairman of North Central Electrical Industries since its inception in 1936. In the affairs of the North Central Electrical Association of private utilities he has also played a prominent role. Few men today have achieved greater success in the public utility industry and his contributions to that industry and to the development of business in the Upper Midwest area are legion. He holds the affection and admiration of all who have worked with him through the years. The door of his office was never closed! Few men number among their business acquaintances a wider circle of loyal friends. With them, he can truly say: "As gold more splendid from the fire appears/Thus friendship brightens by the length of years."

The Providence *Bulletin* of December 14 included the following: "A. C. Bruce, 67, Division Engineer of the Public Roads Administration at Albany, N.Y., the office which supervises federal-aid highway activity in Rhode Island, has retired after 31 years of service, according to the Associated Press. Bruce, who attended Brown University as well as . . . Technology, is a native of Gardner, Mass." Bruce appears on our class list as a special student and the fact that he attended another college is probably the reason why he has not been very active in Technology affairs. — The Boston *Guardian* of December 4 included the following: "W. P. Terrell, former Bostonian, graduate of M.I.T., now a teacher of engineering in the public schools of Washington, D.C. was in the city for the Thanksgiving holidays." — JAMES W. KIDDER, *Secretary*, 215 Crosby Street, Arlington 74, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

• 1907 •

A news release dated November 5, 1948, from Carleton College, which is a co-educational institution founded in 1866 and located at Northfield, Minn., stated

that John Frank, whose home address is 1152 Chatfield Road, Winnetka, Ill., had been appointed as a member of the Board of Trustees of the college. John, as you all no doubt know, is president of Ilg Electric Ventilating Company at 2850 North Crawford Avenue, Chicago. He is also a trustee of the Illinois Institute of Technology, a board member and past president of Jewish Charities of Chicago, and also is a former president of the North Shore Art League, Winnetka.

Under date of January 7 I received a letter from Hermann W. Mahr, which reads in part as follows: "At the end of 1948 I retired from service with the DuPont Company, with whom I held the job as production manager of the Fine Chemicals division, upon completion of 30 years of service. I am now working with the Office of Production of the National Security Resources Board as a part-time consultant on chemical production. My address will be Hotel Congressional, 300 New Jersey Avenue, Southeast, Washington 3, D.C., until I complete this work; after which I will probably be located on Cape Cod at East Dennis for the major portion of the year."

The New York *Times* of December 1, 1948, contained a news item telling of the death on November 29 of Kenneth Major, who was associated with our Class in the Course in Naval Architecture. He was formerly with Guaranty Trust Company of New York and at the time of his death lived at the Forest Hills Inn, Forest Hills, Queens, N.Y. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

• 1909 •

By this time all members of the Class should have received the first notice of the reunion plans. Henry Spencer, II, and Art Shaw, I, of the committee in charge, are continuing with the plans. Note that we have also drafted George Haynes, VII, his special duty being to assist us in the publicity work, taking advantage of his well-known talents in that direction. The place is East Bay Lodge and the dates are Saturday and Sunday, June 18 and 19; although a number have planned to arrive on Friday so as to be on deck early on Saturday morning. The time and place are most appropriate for it was just 20 years ago, June 14 to 17, that we held our 20th at East Bay Lodge. We hope to show some of the group photos of the past reunions. The response to our appeal in the January number for contributions to finance the reunion has been most generous among a few individuals and we have every reason to believe that this trend will continue. We also hope that Molly's several appeals for the class endowment fund will meet with generous response.

Many of us have been greatly shocked to learn of the passing of Reg Jones, VI. In the January Review you will note that Paul reported that he and Reg were attending the meetings of the M.I.T. Committee on Financing Development which is planning to raise \$20,000,000 for the Institute. Reg and Marian, as well as Paul,

stayed at the Review Secretary's home. Reg seemed sound and healthy and talked of future plans when he retired in a few more years. He passed away early Friday morning, January 14, at his home in Summit, N.J., following his return from the hospital after an operation on his lungs. Paul, V, and Hardy Cook, V, attended the service. Paul reports that nearly 400 others were there. For a number of years Paul has been closely associated with Reg, particularly in connection with '09 and Institute work in the New York area, so we have asked him to contribute a memoriam to the class notes: "It is my unhappy duty to tell you of the loss of a distinguished and, to me particularly, a beloved friend and classmate, Reginald L. Jones. Reg and his family made their home in Summit and I have driven over to see the Jones family many, many times and always with comfort to myself. Many of us have seen Marian at class affairs. Betty, the daughter, age 23 and a graduate of Emma Willard School of New York and Wellesley College, has just married Donald Fuchs and now lives in Manhattan. There are two boys, Reg, Jr., 22, and Peter, 18. Reg, Jr., graduated from Princeton University last June and is now working with the Central Hanover Bank of New York. Peter is a senior at the Pingry School, Elizabeth, N.J., and is president of his class. I am sure I speak for all of us when I send Marian and the children our sincere sympathy in their loss. My contacts with Reg, I am happy to say, were mostly personal. He always came to any class affair. At a class luncheon, I was sure the party would be a success if Reg was to be there and that other fine man, classmate and Bell Lab officer, John Mills. Now and then Reg would ask me to come and lunch with him at the Laboratories. Reg's office was a huge, uncrowded room with a fine view out over the Hudson River. A waitress in uniform would appear and right on Reg's desk a delicious lunch would be served as if by magic. These luncheon dates were always delightful occasions for your Class Secretary, I can assure you."

Aside from George Gray, VI, probably no one has been more closely associated with Reg throughout his career than the Review Secretary. For four years we were undergraduates in Course VI, working together in the laboratories and studying often into the wee morning hours. After graduation I became an assistant and Reg went on to study for his doctor's degree, the second in electrical engineering. I believe; Harold Osborne '08, having been first. Both of us were obliged to do outside work to help with expenses, and after graduation we both taught evening courses at the Franklin Union in Boston. In later years, we were closely associated in the work of our profession, a considerable amount of which has been performed with the American Institute of Electrical Engineers. Reg, after serving in many other capacities, was in the midst of his second year as chairman of the most important Standards Committee and for a long time I had also been a member. The efficiency and effectiveness with which he conducted the work of the committee were common knowledge, and my own particu-

lar assignments were greatly enhanced and facilitated by the high degree of co-operation which the Bell System extended through his good offices. We shall all miss him I can assure you.

As a tribute to his accomplishments, a half-column obituary with his picture appeared in both the *New York Times* and the *Herald Tribune*. He was connected with the Bell Laboratories for 38 years, contributing much to advance the art of telephoning in the improvement of transmitters, receivers, repeaters and other equipment. He served as captain in the Army Signal Reserve Corps in World War I, guiding research on communications for the armed forces. In 1923 he returned to the company and became inspection manager and organized what was probably the first industrial group engaged in scientific quality control which proved to be one of the Bell System's greatest contributions to industry. After the organization in 1924 of the Bell Laboratories, he became director of the apparatus development, which during the War contributed heavily to Radar, Sonar, the gun director, and to scores of smaller projects. In 1924 Reg was made vice-president in charge of staff. This included patents, legal services, accounting, purchasing, publication and the great Murray Hill Project group of buildings. Testimonials of his success in this high office have already appeared in these notes. I can also attest to the high esteem in which he was held by his colleagues and subordinates. He was quiet, sympathetic, and always willing to see their viewpoints. A Union leader stated: "He had always an open mind in this field. We have lost a friend who could always be counted upon." In addition to the American Institute of Electrical Engineers, he was a member of several other scientific and learned societies. At Summit, N.J., he was director of the Summit Trust Company and had been president of the Board of Education. For a number of years he had been a member of the Visiting Committee to the Department of Electrical Engineering at the Institute and was appointed a member of the recent Finance Committee. We of the Class can testify to his untiring efforts in its behalf; and with Paul and Molly he formed the committee which is currently increasing the class endowment fund. (We trust that class members will keep this in mind when making their decision as to their contribution. We are pleased to announce that Johnny Willard, II, on learning of Reg's passing, immediately volunteered to take his place.) A. J. Gould, former master at the Abington, Mass., High School, on another occasion honored Reg with being the school's most outstanding graduate, and Mr. Gould, no longer young, made the journey from Boston to attend the funeral. The Class officially, and also through individuals, has sent floral tributes and notes of sympathy to his family. We all have lost a good friend, conscientious and hard working, an honor to the Class and to the Institute.

Paul has received a letter from Thurston C. Merriman, III, excerpts of which are as follows: "After graduation I spent six years as assistant metallurgist, American Brass Company, then five years at Winchester Repeating Arms Company, one

year at Western Electric's Hawthorne Plant, and seven years at Western Cartridge Company, East Alton, Ill. In September, 1929, I started as metallurgist in charge of chemical and physical testing laboratory, research, and so on, at Seymour Manufacturing Company, Seymour, Conn. This lasted until 1946. I then went to work as consulting metallurgist for Phosphor Bronze Smelting Company in Philadelphia." (Thurston then goes on to state that he was "released" unjustly and now at 62, with long experience in metallurgical work, he has become rather discouraged since he finds it impossible to use this experience on account of the reluctance of industry to employ men of his age. We trust that some opportunity may yet come to him.) "As for personal data, in 1912 I married Louise Wadhams, Mount Holyoke 1910, who has been with me ever since and is with me now. We have three children, as follows: Curtiss W., (Boston University) who is with the Liberty Mutual Insurance Company, married, with one daughter. He had a year and a half on PT's and YP's in the North Atlantic and then over a year in Japanese-occupied China on intelligence and guerrilla work for SACO. His younger brother, Thurston S., has been with the Scoville Manufacturing Company since graduating from M.I.T. in '39, is married, and has three daughters. Our only daughter, Laura Lou, was married last September to Wallace D. Hayes, and transferred from two years at Westminster Choir College to Pembroke College at Providence, since her husband is assistant professor of applied mathematics at Brown University Graduate School. Mrs. Merriman and I hope to be at the '09 reunion in June at Oyster Harbor." — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 285 Madison Avenue, New York, N.Y. GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

• 1910 •

It is with great sorrow that I have to report the death of Don Williamson. Harold Lockett sent me the following from the *Chicago Tribune* of January 2: "Services for Donald V. Williamson, president of Williamson Adhesives, Inc., Chicago, will be held . . . in Emanuel Episcopal Church, La Grange. Born in Louisville, Ky., he was a resident of La Grange for 24 years. He was a graduate of . . . Technology. Mr. Williamson was a past vice president of the Rotary Club of Chicago and was a past chairman of the board of the Adhesive Manufacturers Association of America. He was secretary of the Illinois Small Business Men's Association and of the Conference of American Small Business. He is survived by his widow, Elanor, two daughters, Mrs. Eleanor Whittier, of Glendale, Cal., and Mrs. Lillian Truesdell, of Bay Village, O., and a son, Donald."

In January I found it necessary to be in New York at an indeterminate date. I therefore decided to make my trip so that I would be there the third Tuesday of the month in order to attend the luncheon

held by classmates located in New York. I called Carroll Benton at Exchange 3-9800, Extension 2815, and was given full information as to place and time. It was a most enjoyable occasion. Those present were Karl Fernstrom, Carroll Benton, Carroll Shaw, John Lodge, Erford Potter, Howard Trueblood and Stuart Henderson. To all classmates who happen to be in New York on the third Tuesday of the month, I recommend that they endeavor to attend the luncheon of that date and they will be rewarded by a fine time and excellent food. — HERBERT S. CLEVELERDON, *Secretary*, 120 Tremont Street, Boston 8, Mass.

• 1911 •

With Phil Caldwell, I, as master of ceremonies, Dick Gould, XI, and Harry Tisdale, V, as aides and President Don Stevens, II, as instigator, another fine "Luncheon for Dennie" was held at the Technology Club of New York on January 12, at the end of my trip to the big town for the annual convention of the National Association of Retail Secretaries. There were 19 classmates present and Walter Welch, VI, won the "grandchildren derby," with Royal Barton, VI, and Dennie, with four grandchildren each, sharing second honors.

Royal Barton, VI, continues as rate consultant for Ebasco Services, Inc., having just celebrated his 25th anniversary with Electric Bond and Share Company. He and his wife have three children, two grandsons and two granddaughters. — Phil Caldwell is with Robertson Paper Box Company, with headquarters in New York. He and his wife live in Pelham Manor. They have two sons and three grandchildren. — Lester Cushman, IV (remember him as the Royal Chef in Tech Show days?) is a consulting mechanical engineer. Lester and his wife have four aces: one son, one daughter, one grandson and one granddaughter. — Joe Gershberg, VI, is a division engineer with Consolidated Edison Company of New York, located at the Hudson Avenue Station in Brooklyn. He and his wife have a married son, one grandson and one granddaughter. — Dick Gould still heads the sewage disposal section of the Department of Public Works in Manhattan and claimed distinction for having the most widely scattered family. He and his wife, living in Douglaston, Long Island, have a married daughter in Honolulu, who has a son and a daughter; another daughter living in Santa Barbara, Calif.; a son practicing architecture in San Francisco, R. H., Jr., '41; and another son who is in London.

Joe Harrington, VI, is now with Enjay Company, Inc., 15 West 51st Street, a Standard Oil Company of New Jersey subsidiary. He and Rose live in Larchmont, have one married daughter, Mrs. Walter C. Conary, and a younger daughter, Joanne, who is a sophomore at New Rochelle College. He said he still enjoys trout and salmon fishing as a favorite avocation. — C. R. Johnson, X, has recently started his own company, Spencer Products, Inc., 111 Penn Avenue, Patterson, N.J., manufacturing chemicals for the rubber industry. He and his wife live in

Ridgewood, have four children and three grandchildren. — Norman Lougee, VI, reports business is excellent with his consulting engineering firm, N. A. Lougee and Company, successors to J. H. Manning and Company at 120 Broadway. He and his wife live in Bronxville and have three children and one grandson. — Bob Morse, VI, continues as cable engineer with American Gas and Electric Service Corporation and he and Margaret, residing in Summit, N.J., have two daughters, one of them married and mother of a young son. — J. B. Nealey, I, after a number of years with I.B.M. is now in pharmaceutical manufacturing, married but no children.

Dick Ranger, VIII, is busy at his Rangertone, Inc., plant in Newark, N.J., now almost exclusively in the manufacture of magnetic tape, with a new offshoot now developing rapidly; synchronized sound for motion pictures and television. He and his wife have a daughter and an adopted son, two grandsons and one granddaughter. — Pat Russell, II, reported that he is doing well in real estate, with offices at 139 East 66th Street; has a wife, but no children. — Johnny Scoville, IV, is a production engineer with Sanderson and Porter, consulting engineers, and he and his wife have one married daughter, but no grandchildren. — Nat Seeley, II, is in the manufacture of small hardware as vice-president of Cornwall and Patterson Company, Bridgeport, Conn. He and Louise continue to reside at 115 Van Rens, Stamford, and they have three fine boys: Frank, married and the father of a son, Tommy, and daughter, Susan, is with Trumbull Electric Company in Baltimore; Clinton, a student at M.I.T.; and David, a student at Phillips Exeter Academy.

President Don Stevens, who with his wife, Lois, had entertained me at their Ridgewood home the night before, said he had nothing new to report since the Kilian-Compton dinner. Don continues as vice-president of the Okonite Company and he and Lois have one daughter, two sons and one granddaughter. He said it was a great pleasure to entertain "Stop the Music" Dension. I had been chosen from the audience at the "Stop the Music" ABC broadcast, on January 9 and had been able to correctly identify an interrupted tune, on which a telephone contestant failed, and so won a Schick Ejector Razor and a Westinghouse Electric Refrigerator and Freeze Unit.

Harry Tisdale said he and Grace still live in Scarsdale and have no children. He said his company, American Dyewood, had recently passed its 150th birthday, having been started in 1798 as Walter Partridge and Sons. — Ralph Walker, IV, noted architect, married but with no children, told us of what he termed the most interesting project with which he has yet been associated; the Argonne National Laboratory, now being erected under his direction at the University of Chicago, to house a nuclear science center. He also said he was proud to have been recently made chairman of the Friends of the Library at M.I.T., where he is chief architect for the new library. He urged new supporters for this worthy organization, whose chief function is to see that books not otherwise available are secured for use by M.I.T.

students. — Walter Welch, VI, office manager of Combustion Engineering Company at 200 Madison Avenue, admitted that identical twins undoubtedly gave him the top spot in the grandchildren event, for he and his wife have two boys and a girl, all married, with two granddaughters and three grandsons. — The group unanimously endorsed the resolution sent by last November's "Seven Come Eleven" group in Boston to General George Kenney, II, now head of Air University, Maxwell Field, Alabama, as reported in the January class notes. It was a fine affair all the way through.

From Washington, D.C., on New Year's Day, Mr. and Mrs. David St. Pierre Gailard, VI, announced the engagement of their daughter, Monica Blodgett Gaillard, to Frederick Taylor Peck, Jr., son of Mrs. F. Taylor Peck, of Spring Hill, Mobile, Ala., and the late Mr. Peck. She is a senior at Smith College, while he is a graduate of Spring Hill College and has a master's degree from Georgetown University, where he is a member of the staff and a candidate for a Ph.D. degree. During the War he served as a lieutenant in the Navy. — As a result of being in a group organized last fall at the Union League Club in Chicago, Jim Duffy, VI, business consultant in the Windy City, has become intensely interested in the Great Books movement. One Sunday toward the end of 1948 he was invited to appear on the television program conducted each Sunday. As you and I can well imagine, Jim made a real hit and has been an active participant each Sunday since. The program goes out Sundays at 8:30 P.M. over WENR-TV Channel 7 under the title, "What Do You Think?" The leader is Lloyd Wendt, author of *Bet A Million*.

Had a fine letter from Otilie Cushman, who with her husband, Paul, VI, now lives in a most attractive new home at 1212 Marlboro Lane, Oklahoma City 6, Okla., where Paul is with the L. and S. Bearing Company. Paul has been giving many talks on "bearings" throughout the state and he is also very active helping on Masonic degree work, having recently received a High Priest's ring from Valparaiso, Ind., where they formerly were. He is also on the Unitarian Church finance committee. — Another nice letter recently from Ted Van Tassel, X, enclosed an effusion by C. H. S. Merrill, I, in the Boston *Herald's* "Mail Bag" headed, "Doubly Better Britain." In it, he says the truth of the oftheard statement: "Britain does things better" has been recently accentuated to him by a news dispatch concerning one branch of their socialistic government, the National Health Service, and its remedy for the evils attendant on being bald. Writes Merrill: "If you were bald, as I am, you would realize that a National Health Service that gave you free for nothing a real, genuine wig was certainly a demonstration that 'Britain does things better.' Better did I say? Doubly better! Yup, doubly better — they give you two wigs! Two wigs — one being cleaned, free for nothing, while the other is being worn . . ."

O. W. Stewart, I, advises that Ray Lord, VI, has just resigned as vice-president and secretary of the Manufacturers Mutual

Fire Insurance Company, Providence, R.I., and has accepted the presidency of a new insurance concern just organized by the nine Factory Mutual Fire Insurance companies to underwrite fire risks which do not meet their high standards. — Down in Marlboro, Mass., John A. Bigelow, IV, continues to be appointed yearly city engineer and custodian of city property, also Rotary Club secretary. — Colonel Henry C. Davis, VI, has retired from active Army life. Doc and his wife are now at 4526 Eighth Street, Riverside, Calif. Francis A. Moore, II, is now at 950 Norton Street, Apartment 10, Jackson, Miss., and Theodoros Polhemus, XI, has moved from Newton Center to Sudbury Road, Concord, Mass.

At the turn of the year 1911 still held an enviable position in the Alumni Fund race with 147 subscribers (122 per cent quota) pledging \$3,300 (118 per cent quota) and still three months to go. You know, it's no chore but rather a satisfaction to be Class Agent for you classmates, you always support me so grandly! — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

• 1912 •

The 1949 reunion is now definitely scheduled. The canvass of the Class showed a minimum attendance of 28, with 22 more still uncertain and many others unreported. There is a great deal of enthusiasm on the part of those planning to come. The indications are that there will be as many present at the event as in 1947 and that it will be just as enjoyable and successful. Fred Shepard again has the help of Albion R. Davis and Ernest W. Davis in planning the affair. The dates will probably be either the week end of June 10 or June 17, depending upon the arrangements that can be made as to location. You will be informed as to the details as quickly as possible. Make your plans to be there!

A number of interesting news items were included in the 116 replies received to the 348 cards sent out. The most distant reply came from Dr. Max Levine, VII, Chief, Bureau of Laboratories, Department of Health, Territory of Hawaii, who writes: "I had hoped to be at the 30th and again at the 35th anniversary of our Class but the first date was impossible because of the War and the second found me on my way to Hawaii. I certainly hope to be on the mainland this spring and if our Class gets together, it will be an additional incentive for making this long trip. I spent the period from December 5, 1941, to November 12, 1946, in the Service. I was ordered to duty in November, 1941 (before Pearl Harbor), from the Reserve with which I had retained a commission since World War I. Now I have spent two Pearl Harbor days in Honolulu and find it rather interesting." — The runner-up in long-distance replies was from Ruben Castro-Beeche, VI, of San Jose, Costa Rica, who will probably attend. He is general manager of the *Compañia No. Amer. Distribuidora de Gas, Ltda.*, distributing Esso gas manufactured by the

Standard Oil Company of N.J. — Another member of the Class who is far from the Institute is Roscoe D. Hart, VI, of Peoria, Ill. Mrs. Hart writes: "My husband is in Korea working for the government. He is a member of a power mission trying to increase electric power output in Korea. His address is in care of Korean Power Mission, A.P.O. 235, Postmaster, San Francisco, Calif."

Some of the other comments follow. Charles W. Webber, VI, of West Acton, Mass., has been a safety engineer for 25 years. His hobby is making toys for six grandchildren. Andrew F. Allen, VII and XI, believes that: "We are getting along to the age that should allow and warrant us in meeting more frequently than was possible when we had our noses on the grindstone." Cyrus F. Springall, IV, notes that: "The 1912 attendance at the annual Alumni Banquets has not been very good. Last year only eight fellows showed up." Kenneth Cartwright says: "I will come if at all possible as I had to miss the reunion in 1947." Wallace J. Murray, X, writes: "I have to travel a great deal and cannot tell until the last minute whether I can attend. At the time of the 25th I was in Cleveland, and during the 35th I was in North Carolina. I hope to get to this one." Roger W. Davis, X, states that his activities, past, present and future, consist in practicing law. His family comprises his wife, three sons, three daughters-in-law and two grandchildren. One son is a doctor, one a lawyer and one an engineer who graduated from Technology in 1943. His hobby is 150 apple trees. Merle Randall of Berkeley, Calif., would not attend a reunion this year as it would be "too far away. I got back to Boston in 1940 but could not find Pink's restaurant. I am now professor emeritus at the University of California and am doing general consultation. I see some of the old timers occasionally at the San Francisco Technology lunches." Another Californian, Paul E. Jeffers, IV, is now president of the California Board of Registration for Civil and Professional Engineers. From the other end of the country, Walter M. Ruby, II, writes that he has been in Florida three years now and it looks permanent. He is building official for the city of Lakeland. He enjoys golf and fishing for recreation, both of which are good. He goes on: "Mrs. R. (Emerson College of Oratory; remember St. Stephens Street) still stands by; 1912 is the anniversary, too. Daughter (William and Mary '45) is in Boston raising future Emerson and Technology students." John M. Hargrave, VI, of Metcalf, Ga., reports: "Your card of December 6 to Cincinnati was forwarded to me here. The last reunion I attended was in 1937 and it surely was an enjoyable one. I should like to attend another and if you wish you can count me as a probable for this year. Arthritis is giving me some trouble and if it were not for my tin ear I could hear nothing but a shout. So have the reunion quickly. My personal accomplishments recently consist of five grandchildren; two in Michigan, two in Japan and one in Ohio. Down here in Georgia we have a farm complete with hogs, cattle, peanuts, pecans and regular losses. I commute to Cincinnati to keep up the

output of good clamps and chisels. We also are pretty good at hardening."

We regret to record the passing of Boyd Dudley, Jr., of Syracuse, on December 2, 1948, and Clark F. Higgins of Watertown on December 9, 1948. The New York Times reported: "Boyd Dudley, Jr., president of E. C. Stearns & Co., makers of lawnmowers, died today in his home at the age of 60. Before his association with the Stearns concern, Mr. Dudley was with the old Amphion Piano Co. A native of Hamilton, Mo., he was graduated from M.I.T." The Boston Herald carried this account: "Clark F. Higgins, 59, of 68 Bradford Road, Watertown, facility officer for the Veterans Administration for the past eight years, died yesterday at the West Roxbury veterans hospital. Born in Manchester, N.H., he was graduated from M.I.T. in 1912 and attended Suffolk Law School. He was also an inventor and former manufacturer. He held a patent for a high lift hoist and was engaged in the metal business for many years. He served in the first world war as a captain in the First Division of the 18th Infantry overseas. He was wounded twice and received the Silver Star and other decorations. He was a member of the Mystic Valley Chapter, D.A.V. He leaves his wife and a daughter, Miss Mary Higgins of Santa Monica, Calif." — More comments from the returns next time. See you at the reunion! — FREDERICK J. SHEPARD, JR., Secretary, 31 Chestnut Street, Boston 8, Mass. LESTER M. WHITE, Assistant Secretary, 4520 Lewiston Road, Niagara Falls, N.Y.

• 1913 •

Howard Currier, II, had his picture in the Cincinnati Times-Star of last November 22, together with this story: "Howard S. Currier, Ford Motor Co.'s chief engineer in the passenger-car division, not only will discuss design and development in Ford cars for 1949 in his address at Cincinnati Engineering Club Monday night — Currier also will 'turn back the clock' on the yesteryears of American automobiles and will illustrate that part of his address with slides. The Cincinnati Society of Automobile Engineers and the Cincinnati Automobile Dealers' Association will meet in a joint session at the Engineering Club to hear Currier. Currier, nationally known engineer in automobiles, has been associated with Ford since 1946. Previously, 1929 to 1946, he was with Oldsmobile division of General Motors and, before that, with Cadillac, White Motor Co., and Studebaker. He began his engineering career in 1913 when he graduated from . . . Technology." The job of chief engineer for the Ford passenger car is one of the biggest in this country and we are proud to have one of our men filling it.

Bob Bonney, X, industrialist and gentleman farmer, and breeder of pedigreed beef animals, has acquired the Breen Haven Farm at Elkton, Md. — In the following article, in the Worcester, Mass., Evening Gazette of last November 25, headed, "Edison's Advice," disappointed Republicans can find some basis to agree with at least one Democrat: "Charles Edi-

son gave some good advice to all political parties, in his address Tuesday night in Boston at a session of the National Municipal League. Mr. Edison is president of this league, a former Governor of New Jersey, a former Secretary of the Navy, and a son of the great inventor. He is a Democrat, but has never been narrowly partisan. Attacking the present 'low standards' of political morality, he declared that the first duty was to pay 'attention to politics and government in the home town.' He urged political leaders, starting with local government, to cast out 'seven deadly sins.' These, he said, were indifference, laziness, cowardice, greed, perverted loyalty, false pride and cynicism. These are human faults. Practically everybody has some of them, in some degree. But there is one of them which — far more than any of the other six — applies especially to politics. That is 'perverted loyalty.' Another name for it is extreme partisanship. Still other names might be 'black-and-whiteism' and 'hundred-percentism.' It is the theory that all the good is in one's own party and all the bad is in the opposing party or parties. . . ."

Bob Weeks, VI, with Bill Brewster, II, John Hession, I, and Bill Ready, VI, attended the meeting at Cambridge last November of 300 members of the Committee on Financing Development. Bob had made the trip to Boston from Philadelphia and called at night on his return to tell me about it. Bob still has most of his early remarkable vitality and spark, and he was very much inspired by the plans to keep M.I.T. at the top of engineering schools and independent of government control. You will be hearing more about this subject which affects all of us who have a natural sense of pride or of indebtedness, or both, to the Institute. — Sam Knight, VI, under the letterhead of Sam Knight Mining Lease, Inc., Christmas via Winkelman, Ariz., writes in disparagement of Dave Nason, probably deserved, as follows: "I have been engaged in major research. The problem was the circumforaneous effluent attributed in the December, 1947, Review to Dave Nason. Here are my findings: 1. Nason's polemical periphrasis attempted not only to vilify my person, but also to traduce the refulgent region of my abode (mere jealousy). 2. To seal the acme, said Nason adduced to another's transgression his own adumbral erosion of his washtub's peritoneum. (The truth ain't in him; his own jackrabbit's pet flea challenged Gargantua.) 3. David should have been sent his due (dew?) to begin with." I wish Sam would, in his quaint style, write about himself and what goes on in Christmas via Winkelman, Ariz.

From the December 15, Houston, Texas, Post we have the following containing the sad news of Joe's death: "Joseph A. Tennant, a consulting engineer who pioneered the recycling process used in the oil industry, died Tuesday night in his home at 1505 North Boulevard. He was 60. Mr. Tennant, a graduate of the University of Texas and . . . Technology, came to Houston in 1891 and opened engineering offices here in 1916. He was born in Chicago. He specialized in oil field and power plant engineering, and installed many large utility plants in the

Southwest. Mr. Tennant was the son of the late James H. Tennant, who came to Houston from Chicago to finance the Houston and LaPorte railroad. . . . Surviving are his widow, the former Miss Lucille Borden; three sons, Joseph A. Tennant, Jr., Sidney G. Tennant and James Paschall Tennant and a daughter, Mrs. Robert Flanagan, all of Houston." Joe was in Course VI and prepared at the University of Texas. At school he was active in the Catholic Cosmopolitan and Southern clubs.

Address changes: John Farwell, II, from Hoboken to Danbury, Conn.; George Forrester, X, from Nahant to Syracuse, N.Y.; Malcolm Lewis, VII, from Durham, N.C., to Southport, N.C. — FREDERICK D. MURDOCK, *Secretary*, Box 788, Pawtucket, R.I.

• 1914 •

Word has been received of the death on December 11 of Edwin C. Luce, Jr., following a short illness. Luce came to Technology from Marion, Mass., and following graduation, had made his home there a large part of the time. He did, however, maintain an architectural office in Boston. Luce prepared at New Bedford High School. He will be remembered by many as one of the coaches of our freshman tug-of-war team. After graduation he became very much interested in the Masonic Order. He never married.

Bert Hadley retired this last summer. For many years he has been located in Bridgeport, Conn., with the Remington Arms Company, where he has occupied various executive positions. As this company is part of the DuPont system, he retired under the 30-years-of-service and 60-years-of-age ruling. Bert is, nevertheless, continuing to be active as chairman of the Town Plan and Zoning Commission of Southport, Conn., where he has made his home for many years. He expects, eventually, to leave Connecticut and return to Middlebury, Vt., where he has a farm. It will be recalled that Bert has been a trustee of Middlebury College for many years and chairman of that Board for nearly five years. He expects to continue very active in his work there. He transferred to Technology from Middlebury College.

Ralph and Mrs. Perry have announced the marriage of their daughter, Madeline, to Maurice Edmond Perreault on December 18 at Torrington, Conn. — A recent note from Fred Mackentepe tells us that he is still with the Zaremba Company of Buffalo, and continues to represent them in the Midwest, working out of Chicago. Their specialty is evaporators used in the food, chemical, and process industries. Fred is another one of our classmates who has remained unmarried, and for many years he has lived at the Lake Shore Club on Lake Shore Drive in Chicago. He would be very happy to have any classmates who are passing through Chicago drop in on him.

The preliminary information regarding the coming reunion at Pine Orchard, Conn., has gone out to the Class. Further details will be mailed between now and early June. Be sure, however, to set aside the dates of June 17 through 19, as a

large attendance at our 35th reunion is already indicated. — H. B. RICHMOND, *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

• 1915 •

Christmas cards from many classmates widely scattered over the country warmed our hearts with an appreciation of the value of these fine and close old friendships. Thanks from Frances and me to you all. The messages on the cards lend a more personal touch and give us some news for our column. Philip and Helen Alger, 175 Wendell Avenue, Schenectady 8, N.Y., sent a four-verse appropriate Christmas poem. The Daleys of Philadelphia still threaten us with a letter. Henry has two fine sons he could write us about. Addressed to Azel and Company, Ray Stringfield's Christmas message said, "How are all the young married folks? This couple is beginning to feel kind of ancient, as with four grandchildren and a few relatives we'll have 17 around our Christmas table. Our baby, who is 23, is still at home, or at least gets her mail here, and we see her once in a while between dates. Lucile threw a birthday dinner for me a few nights ago, and had Ken and Minnie Kahn, among others. Ken spends his spare time writing for *Chemical Engineering* (McGraw-Hill) and his "boss" says he merely works at Lockheed as a hobby. Saw Bill Mellema about a month ago. He and Pearl took a trip to Holland this summer."

Our classmates do get along. Cheers and congratulations to Jerry Coldwell who, on January first, was made president of Ford, Bacon and Davis, Inc., in New York City. Executive Vice-president since 1947, Jerry has been with the company since 1926 and diverted the operation of the Arkansas ordnance plant and certain phases of the famous Oak Ridge, Tenn., project during the last War. Pete Munn has been made president and treasurer of Jackson and Company, Inc., Investment Securities, 31 Milk Street, Boston 9, Mass. A member of this firm for a long time, Pete is well known as an active and loyal classmate.

Supplementing last month's announcement of Hank Marion's promotion to vice-president of Phelps Dodge Copper Products Corporation, we learn that for many years Hank has been in charge of production control and co-ordination of operations as assistant to the president. The corporation is one of the largest fabricators of copper in the world with plants at Yonkers, N.Y.; Elizabeth, N.J.; Fort Wayne, Ind.; and Los Angeles, Calif. Wally Pike has enlarged his firm, Cleveland, Varney and Pike, Consulting Engineers, 120 Tremont Street, Boston, to take in, among others, Lawrence J. Tracy '23, IV. Bert Adams is back entertaining and mystifying the public. On January 3 he gave a show in Springfield, Mass., for the members and guests of the Faith Church Men's Club.

After talking to Jim Tobey recently, I received this good note: "Glad to hear your voice the other day and hope you will give me some advance notice the next

time you come to town so we can get together for lunch in accordance with the nutritional rules in *Your Diet for Longer Life*. The book is doing all right. Mrs. Tobey and I hope to get another month in Florida this winter, probably beginning the end of January, and will make our headquarters at my daughter's place in Gainesville." Fred Stetson has moved from Philadelphia to 5113 California Street, Omaha, Neb., where he is plant superintendent for Farm Crops Processing Corporation. At the pretty church wedding of his son, Dick '51, VI, to Shirley Vincent in the Second Congregational Church, West Newton, Mass., on December 18, Frances and I saw Bill Brackett in all his dignity. Hearty congratulations and best wishes to this charming young couple from 1915. Pieced together with bits and scraps of news from here and there, the column has survived another month. What about the future? Help! Help! — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

• 1916 •

One of the most interesting letters to arrive in some time has breezed in from the warm areas of the Canal Zone. It is from Meade Bolton, and includes a clipping from the *Sunday American* of said Zone, which gives a very comprehensive account of this well-known architect from his Technology days on. It seems he joined the Panama Canal Office engineering division fresh from college in June, 1916, where he has remained ever since. During his service, in addition to ordinary and experimental living quarters for employees, Meade has designed many outstanding Canal and civic buildings, including the British legation in Panama City, Cristobal High School, Canal Zone Junior College, and other buildings. He has also designed privately, and has churches and private buildings to add to his long impressive list. Lately he has been occupied with designing the new Panama Canal experimental houses, and before his retirement in April of this year he hopes to complete work on two "million-dollar-category" jobs; the obstetrical and clinical buildings to be erected at Gorgas Hospital. He and his wife, the former Helen Reinman, whom he married in 1940, are strong advocates of life in the Canal Zone, and express no great desire to return to the United States after his retirement. However, in his letter, Meade states: "I have no plans and do not know what I shall do except look for another job somewhere else. If you hear of a job you think I can fill let me know." Anybody have any ideas? He is a member of the American Institute of Architects, New York chapter, and was a delegate to the Inter-American Congress of Architects in Lima, Peru, in 1947. He is also department commander of the American Legion, Department of Panama, and to conclude, lists his proudest achievement of his life as the hole-in-one he made at the Amador Golf Club in 1930.

We recently received a reprint copy of a paper on "Nitration of Wood Pulp" by Milton Schur, with coauthor Douglas McMurtrie '15, published in the *Paper Trade*

Journal in September, 1948. We don't understand it all but it looks as though the authors knew what they were talking about. Milton is at present technical director of the Ecusta Paper Corporation, Pisgah Forest, N.C., and was formerly director of research and development, Brown Company, Berlin, N.H. — Hovey Freeman, our good Class Treasurer, dropped a note to tell us he is proceeding apace, but is letting up on his fast and furious pace by resigning from "two or three directorships" in the past year or two. He is now chairman of the National Fire Waste Council. He states that of his six children, four are happily married, two are still in school, and that four grandchildren have already appeared.

Someone we haven't heard from for a long time is Spotts McDowell, who has sent us the following: "I am still in the employ of Harbison-Walker Refractories, and spend much of my time on problems connected with refractory raw materials. Just now I am working on the revision of *Modern Refractory Practice* a combined handbook and catalogue published by Harbison-Walker. I have never married. My mother, now in her 94th year, is in good health and is keen and alert mentally. I have quit trying to play golf (I never got beyond the dub stage) and have given up all hobbies except stamp collecting, which I work at occasionally in a very amateurish way." Spotts has been with Harbison-Walker practically all his adult life, having started at surveying, mapping and engineering projects after leaving high school. After graduating from the Institute he joined the technical division of the sales department studying technical problems on the use of refractory materials, largely at the plants of consumers. This kept him on the West Coast until 1920. Since 1934 he has worked on special assignment problems connected with raw material supplies and new developments. With the outbreak of World War II when our chrome supply was threatened, Spotts made repeated trips to the mining operations in Cuba in 1940-1943. A pretty complete story of his life history is given in the May, 1945, issue of the *Bulletin of the American Ceramic Society*.

We are glad to report that Earl Mellen, who was in the hospital during the early winter, was able to return home and spend the holiday with his family, and is now on a restricted work schedule at his office. He expresses hopes of seeing everybody at the next reunion. — Somehow or other a letter which arrived from Dutch Gaus last fall has failed, to date, to make the column, and with all due apologies to Dutch for our neglect, we offer at this time excerpts from his letter: "For the past 10 years I've been with the Gardner Denver Company, manufacturers of Air Compressors, pumps, rock drills, and so forth, in their New York District sales office. In fact, I've been 'selling' ever since shortly after World War I. I've been married since 1920 and had two boys. The older boy, Gilbert, after two years at Lehigh, joined the Army in World War II and was killed in August, 1944, in Normandy during the 'break-through' of the 3rd Army. The younger boy, David, just

celebrated his 21st birthday and is now in his senior year at Yale."

We all know that Charlie McCarthy has been way up there for a long time in the aircraft industry. Now we are very glad to include a very informative letter which Charlie has sent us. "I am a vice-president of United Aircraft Corporation and have been attached to the Head Office in East Hartford for the past five years. Prior to this assignment, I spent some 17 years with the Chance Vought Aircraft division of this corporation starting as engineering executive in 1926. I was the general manager of this division when, in 1943, I was elected a vice-president and transferred to East Hartford. The aircraft industry has been going through a period of violent change incident to the introduction of turbo engines, so we have many engineering problems to be solved. I served for about eight years in the Navy on aviation duties and, having retained my commission in the Naval Reserve during this War, found jobs I could do which required my being ordered to temporary active duty of several months. The first, in 1943, took me to the Southwest Pacific where our Corsairs were just going into action. The second included approximately two months service in an aircraft carrier operating with Admiral Halsey's Fast Carrier Task Force off the coast of Japan."

We have just heard from Ken Sully who writes: "Your recent note requests a few words. By way of summary, I have been, since 1926, with the Bureau of Engineering, City of Los Angeles, street opening and widening division. Mrs. Sully and I have not been East since 1937. I regret not having been able to attend the big reunion on Cape Cod. However, my sister, Agnes, wrote us of some of the interesting events which took place at East Bay Lodge." — Our several letters to Charles Woolley finally brought a result by way of a note which states that he is "Chief, Facilities Division, Office of Director of Installations, DCS/M Hq. U.S.A.F." You figure it out. Sounds impressive, anyway. Charlie goes on to say: "Presently, most of my time is devoted to an all-out effort to secure family housing for Air Force dependents, primarily by interesting private enterprisers in the construction of multiunit rental developments at or near Air Force bases."

Walt Binger shows great compassion for class secretaries in general and sends us this encouragement: "Having always pitied the Class Secretary, whose work is never done, I, as the Class Historian, who has to think of his job only once every five years, send you these few notes." The few notes turn into a very long and interesting letter. Walter is vice-president of the City Investing Company, New York, a real estate investment organization which also does considerable construction for its own account. He continues: "Besides being busy with construction under peculiarly difficult New York conditions, I have done a fair amount of extra curricula work this last year. The most important is that I was made chairman of the Citizens Traffic Action Committee in New York City and as such proposed the creation of a Board

of Traffic Control or Commission which would take from the police all authority to make traffic rules, leaving to them only the enforcement. Just a year and a day after announcing this plan in detail, the Mayor of New York adopted it almost as written and it is believed that it will be enacted into law. The other job was my appointment as consultant to the Office of Civil Defense Planning in Secretary Forrestal's office. Since my son, Bronson, is a freshman at Harvard and my son-in-law is in his last year at the Harvard Law School, I was glad to be able to work out the combination of a family reunion, the Harvard-Yale game, and attendance at the Committee on Financing Development of the Institute."

We have a letter from Duncan Owler whom we have not seen since graduation. Duncan always was modest, but he always got there as you can see by reading his letter: "I realize that if all contributed to the class notes in *The Review* as well as I have, it wouldn't take long to read them. The reason wasn't for lack of interest, but the fact that there wasn't a thing I could think of to write, having led a rather uneventful career from the time of graduation. After graduation I was with the Cutler-Hammer Manufacturing Company, Fall River, Mass. A few years later I became superintendent of distribution, and in 1927 general superintendent. In 1934 I was appointed manager and elected first vice-president and director of the company, and am still in that capacity. I have no family and, therefore, nothing to relate in that line."

If we may be permitted, we will blush with pleasure as we print the following letter from Charlie Makepeace who says very nice things to us and makes our work as secretaries seem even more worthwhile. He writes: "Before replying to your request for some of my personal history during the past few years, I want to offer my hearty congratulations and sincere thanks to Messrs. Fletcher and Dodge for the excellent job which has been done in gathering news from the members of our Class and preparing the material for publication in *The Review*. Many of us can remember that several years ago it was a fairly common occurrence for the 1916 class notes to be rather meager and often missing entirely; now, however, under the systematic campaign for news carried on by our able Secretary and Assistant Secretary, our notes are copious, interesting and unflinching in their regularity of appearance. I hope that other members of 1916 will appreciate and co-operate with you in the splendid job you are doing. As for a report on my own activities, I am engineer for Lonsdale Company, manufacturers of cotton textiles, with the main office in Providence and plants in three nearby Rhode Island towns. Of course, New England has lost a great many cotton mills and some of its prominence in the textile field to the South during recent years; however, we still feel that our company has the know-how and equipment to compete with the best of them and we expect to continue. So much for my work, except that last winter I took time off to do a job for another company which was about to

build a mill in Puerto Rico. Mrs. Makepeace and I spent three months there while the design was being completed and thereby missed an exceptionally rugged New England winter. My only daughter, 25, is credit manager and one of the secretaries for the Federal Products Company of Providence, which manufactures gauges and other precision instruments. My twin sons, 23, graduated from the United States Merchant Marine Academy at Kings Point, were commissioned ensigns, U.S.N.R. and U.S.M.S. Both of them, the latter portion of the War, were on tankers and cargo ships, but now they are ashore again and employed as engineers by the Grinnell Company; one in Charlotte, N.C., and the other here in Providence. My spare time, of which there is much less than I could wish for, is spent mostly on and around the waters of Narragansett Bay, sailing, fishing or gunning."

As the last entry for the month, we pass on to you the brief news received from Victor Dunbar, now of Schenectady, N.Y. In somewhat hieroglyphic form, Victor informs us that he is auditor, department of the Air Force, office of the Auditor General, Eastern Region, General Electric Company, Schenectady 5, N.Y. It sounds like a long title, but that is the way he says his business address reads. His son, Donald, is now teaching psychology at Hamilton College, Clinton, N.Y., and was with the Office of Strategic Services in the War. — Oh, yes, a Christmas card from Herb Gilkey was one of the most unusual we received. It pictures, via some of the most appealing photographs we've seen in a long time, a delightful family group consisting of Herb, his wife, his son and daughter-in-law, (Mr. and Mrs. Herbert Talbot Gilkey), another son, Arthur, and a truly delightful one-and-three-quarters-year-old granddaughter, Virginia Anne Gilkey. The brief note on the back of the card says Herb is "connected with Gramstorff of the American Society for Testing Materials in Detroit and with Howard Whipple Green in Cleveland after the 32 years since graduation."

Notice has been received from the Alumni Secretary of the deaths of Nicholas Mumford on July 7, 1948, and Walter Haynes on October 5, 1948. Walter was dean emeritus and member of the Board of Regents of Multnomah College, Portland, Ore. — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

• 1917 •

Ken Kahn '15, writes us the sad news of the untimely death of Ray Goudey. We quote from his letter: "The *Regional Bulletin* of the Southern California section of the American Chemical Society, of which Kenneth D. Kahn, X, is editor, will say in its February issue that Raymond F. Goudey passed away on December 16, at the age of 54. His untimely death was sudden and unexpected for there had been no indication of trouble. He suffered a heart attack from acute indigestion and was gone before a doctor could be summoned.

Mr. Goudey was our speaker at the November meeting and all who heard him realize the deep devotion and love he had for his work. Ray Goudey wrote 75 articles on the problems of water. Some of the subjects include odor control by chlorination, quality of Los Angeles water supply, and a new method of copper sulfating reservoirs, the boron problem in the water supply, removal of salts from water, wartime protection of water supplies, chemical weed control, and detection of poison in water. Two patents were granted to him on sludge treatment, one by the use of chlorine and the other by the use of an improved mechanical method. Besides all his professional organization work, Ray Goudey found time for boys. Both of his older sons are Eagle Scouts. Goudey himself was a diligent worker, the kind to get the elders back of the scenes and make the wheels turn. For over seven years he was with the Hollywood Los Feliz Boy Scouts; he was more than a mere counselor and guide, for he really knew things that good scouts know. He was an ardent camper and hiker, and on several occasions took his family on pack trips into the High Sierras."

The trek to the South has started. Phil Hulburd, on leave of absence from Exeter, is meeting Lin Noyes in Florida in March enroute to California, where he will spend a few months and return to his duties in September. So, any of you who have problem boys at Exeter will have to do without Phil's guidance for these few months. Lin, a real gentleman of leisure, is spending February in Jamaica. Clarence Holt is also sojourning in Florida for the winter. — Tom Ryan, still living and breathing his Sound Scriber, sent us a novel Christmas greeting in the form of a small record, which, according to the card which accompanied it, was a recording of a Christmas Carol that can be played on a Sound Scriber, or on a good recorder. We do not own a Sound Scriber but do have a recorder which reproduces anything from Brahms to Gershwin with great fidelity. We will have to take Tom's word for it that his record was music.

Les Groves is still a news personality. One of his latest speeches was given at the Chamber of Commerce at Cincinnati where he spoke on his well-known atomic energy. — Paul Bertelsen has at long last decided not to be the Flourspar King of the world. We do not know what his next venture will be but to quote him he "expects to get back in circulation," which is a pretty broad term. — Captain Gerald W. Thomson has moved from New York City to 220 Prospect Avenue, Hingham, Mass. — Mack Angas has recently been promoted from commodore to rear admiral and is co-author of an article in the February issue of *The Review*. We should appreciate learning the identity of the gentleman from Cleveland who sent back a reply card on the class gift with the salutation "Hi Ya Freddie." If he will furnish his date of birth we shall be glad to send him an application pronto. The sense of humor of some people is terrific. — Jack and Mrs. Wood have recently adopted two children; one aged six months and the other nine years. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge

42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston, Mass.

• 1918 •

Particularly in a nervous and fitful year, spring means moving time. However, some of the brethren are forehanded. Thus, via Bill Wills, to whom we shall presently come ourselves in this saga, comes news that Arthur J. Marsh did some moving last fall. Not the kind involving cleaned out attics, barrels of china packed in straw, big vans, and strong backs; the kind that involves a minimum of worldly goods suspended from the end of a stick in a knotted bandana, or a convertible, a full gas tank, and a road map. Art had himself a motor trip up and down the coast of Florida, and had it before the mob arrived. As it turned south, he drove back to 364 Weston Road, Wellesley, Mass.

You will recall our chronicle of Edward Sidman on the occasion of his having completed 25 years at Hecht House. The way in which this particular 1918 busy bee has improved the more recent shining hour is by being elected president of the New England chapter of the National Association of Jewish Center Workers at a meeting of this group held at the Springfield Jewish Community Center. Sidman's latest achievement has been met with acclaim by lay and professional Center workers throughout the region. He is a member of the American Association of Social Workers and serves on the executive committee of its Boston chapter. He is an active member of the American Association of Group Workers and is a former member of the executive board of the National Federation of Settlements. The Hecht House, founded originally as a settlement in the West End of Boston, is affiliated with the National Federation of Settlements, the Greater Boston Council of Jewish Centers and the National Jewish Welfare Board.

Albert Haertlein of the School of Engineering at Harvard is now secretary of the Massachusetts State Board of Registration of Professional Engineers and of Land Surveyors. This is not all transits and laurel wreaths as we hear it, because there seems to be vigorous dissatisfaction in some quarters as to what the board does and does not think constitutes a professional engineer. Maybe Albert can pour oil on the troubled waters, or whatever it is a land surveyor does when the going is up and down. Lawrence H. Flett, whose identity will be plain to you when we say "Mike," is president of the American Institute of Chemists. Why shouldn't he be? Remember how he toiled to separate (by titration maybe) the first-rate from what was inferior and pretense in the M.I.T. Student Branch during his sophomore, junior, and senior years? Well, Mike announced in January that Warren E. Lewis '05, emeritus professor of chemical engineering at the Institute, has been unanimously selected to receive the 1949 gold medal of the American Institute of Chemists. The award is made in recognition of Dr. Lewis' administrative ability, outstanding success as a teacher, and for his contributions to research, particularly in the fields of petroleum and leather manu-

facture. Presentation of the medal will be at the annual meeting of the Institute, to be held May 6 and 7 in Chicago. During World War II, Dr. Lewis served as acting executive officer of the Department of Chemical Engineering at M.I.T. and handled all the administrative work in connection with war research projects and war training in that department.

Bill Wills was honored in January by being awarded the annual citation of the Massachusetts State Association of Architects on the occasion of the Association's annual meeting at the Architectural Center in Boston. For news of Julian Avery (electrochemistry and a list of extra-curricular activities as long as your arm) look in the December issue of *Fortune*. As he doubtless feels, recognition has come at last. And for Stephen M. Foster the last has come. He was thrown from a horse while riding on his estate at Great Neck, Long Island. When the horse returned alone to the stable a search was undertaken, which found Steve completely paralyzed by a fractured spine. Next day he died in the Nassau Hospital. Born in Derby Line, Vt., he passed most of his youth in Ottawa where his father was American consul-general. He was graduated from Harvard in 1916 and then joined our Class at the Institute, but withdrew when the United States entered World War I. He served under Douglas MacArthur and was discharged with the rank of captain. In 1931, Foster joined the City Bank Farmers Trust Company where he specialized in factors effecting the money market and business activities. He joined the New York Life Insurance Company in February, 1941. He was widely known as an economist and authority on financial matters. Steve was acting mayor and trustee of the Village of Kings Point and president of the Great Neck Officials Association. — GRETCHEN PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

• 1919 •

Word is still being received from classmates of their intentions of being present at our 30-year reunion this summer. Marshall C. Balfour writes from Shanghai, China: "This is just a note to acknowledge your card about the 30-year reunion. At the moment we are busy evacuating some of our staff in China. I am going to India in December for a few months' stay and expect to be in New York about May 1, 1949. Since I will have Headquarters in New York for a year or more, there is a good prospect that I can attend the next reunion." Bernard S. Coleman writes from his new address, 166 North Citrus Avenue, Los Angeles 36, Calif.: "Expect to attend the 30th reunion. How can anyone stay away, after the good time we had at the 25th? Have been appointed public health consultant to California Chapter of National Foundation for Infantile Paralysis." Milton A. Loucks writes: "If it is humanly possible, I shall attend our reunion in June."

The Newark *News* of January 13 carried a story of Paul W. Blye. He has served as a councilman and has decided to become a candidate for mayor of Ruther-

ford, N.J. The *Enterprise-Journal*, Orange, Mass., carried a story of the death of Ray Powers on September 7 in Berkeley, Calif. Ray Powers was connected with the United States Department of Agriculture in its San Francisco office. The Lawrence, Mass., *Eagle*, November 30, 1948, tells of the election of Arthur S. Johnson to the position of vice-president and manager, engineering department of the American Mutual Liability Insurance Company.

We have received a report that Donald W. Kitchin prepared a joint paper for the National Research Council in Washington, D.C., on "The Effect of Soil Microorganisms on Rubber Insulation." The paper was also given at the American Chemical Society meeting at Detroit. Brief word was received from John Meader. His address is 240 West 71st Street, New York 23, N.Y. Henry L. Cassidy has moved from Irvington-on-Hudson to Osceola Avenue, Ardsley on Hudson, N.Y. Roger T. Hall has moved from Washington, D.C., to 7312 Bradley Boulevard, Bethesda 14, Md. George C. McCarten, formerly of Grosse Pointe Farms, Mich., is now located at Macco Chemical Company, 6600 Union Avenue, Cleveland 5, Ohio. Timothy E. Shea is now located at Teletype Corporation, 1400 Wrightwood Avenue, Chicago 14, Ill. Jacob J. Bolotin of Ohio is now located at 617 West Boston Avenue, Youngstown, Ohio. Thomas J. Hughes is now located at 2136 South Geddes Street, Syracuse, N.Y.

We have received word of the death of George P. Gail of Baltimore, Md., on May 1, 1948. — We hope reunion news will soon be sent out to the Class. Our committee is active in the selection of the place and time for the reunion and as soon as these are settled, we will notify the Class. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

• 1920 •

From Buz Burroughs I have just received a welcome report of our classmates' activities in connection with the M.I.T. Club of New York's annual dinner held in December. Buz did a good job of rounding up 1920 men for this occasion as you can see from the following list of those who attended: M. S., and Mrs. Burroughs, F. L., and Mrs. Mead, George F. Des Marais, James J. Wolfson, David J. Kaplan, Leo Kahn, Al Glassett, Ed and Mrs. Burdell, F. L., and Mrs. Bradley, Walter A. Sherbrooke, George and Mrs. Dandrow, and Anthony and Mrs. Anable. Buz says he also heard from quite a few of the fellows who were unable to attend and received a telegram from Flossie Fogler Buckland. All this is heartening evidence that the spirit of the Class of '20 is still strong. Buz and Al Glassett were on the dinner committee of this brilliantly successful affair and Ed Burdell is vice-president of the Club. Buz is still associated with the Dexter Folder Company, 330 West 42nd Street, New York, and recently I ran into his old sidekick, Mish Bawden '21 who is associated with the same com-

pany but in their Boston office. Mish still retains his boyish good looks and seemed to be in the pink.

Ed Burdell who, as you know, is director of Cooper Union and expert in the fields of city planning and zoning has been named chairman of the committee on housing of the 100 Year Old Service Society, a New York organization that seeks to improve poor housing conditions and is the largest private, non-sectarian family and health agency in the United States. At one time or another Ed has served on the Zoning Adjustment Board and on the Municipal Housing Board of Columbus, Ohio; the Ohio State Commission on Unemployment Insurance; the Ohio State Relief Commission in Charge of Education, and on the Massachusetts Board of Prison Industries. — The Christmas season generated a few most welcome greetings from classmates, including the usual interesting card from Denise and K. B. White from their unusual and attractive home at 1300 Manhattan Avenue, Union City, N.J., and an impressive card from Albion and Mrs. Doe and their son, Charles, picturing the stained glass window in their white marble chapel and containing a most friendly invitation to visit their estate in Beechmont Park, New Rochelle. Welcome word was also received from Bunt Murphy with the news that he is now executive director of the Berkshire Farm, Canaan, N.Y., a training school for boys, some 150 in number, so that Bunt is kept busy.

Harold Smiddy has been elected a vice-president of the General Electric Company and continues as general manager of the company's chemical department in Pittsfield and air conditioning department at Bloomfield, N.J. His home address is 340 Riverside Drive, New York. Harold Dennison of Weymouth, Mass., was architect and general contractor for the handsome new building of Dedham Motors on the Providence Turnpike. He has designed many large buildings hereabouts. His home is at 199 East Street, Weymouth Heights and he has four children. Commander Melville Powers has been appointed director of the Pratt Institute. During his 30 years of service with the Navy he was for a time professor of electrical engineering and physics at Annapolis and was a member of a Naval mission to Peru where he acted as technical advisor to the Peruvian Minister of Marine. More recently he was assistant general manager of the Tampa Shipbuilding Company during the War and later was a consultant in the construction of ships and shipyards. Commander Powers resides at 6 Brookside Circle, Bronxville, N.Y., and his sons, Donald and David, are both at M.I.T.

Flossie Fogler Buckland has a son, Larry, who entered the Institute this fall and a 15 year old daughter, Joan. Flossie is still active in the general engineering and consulting laboratory of General Electric Company at Schenectady and is the fourth woman to be honored with a full membership in the American Institute of Electrical Engineers. Lauren B. Hitchcock, Vice-president of Quaker Oats Company made the headlines the other day when he told a University of Buffalo audience that: "The technological progress in

this country has produced so many better mousetraps that the world no longer beats a path to any manufacturer's door. The enterprising manufacturer today must beat a path to the consumer's door and prove that he does have a better mousetrap." If any member of the Class wants to know how to do this, I am sure I don't need to remind him that Harold Bugbee heads up Walter B. Snow and Staff, Inc., industrial advertising agency.

Arthur Dopmeyer is in San Francisco; address, 2337 Francisco Street. Roger Colten has left Washington and is in New York; address, 6 Peter Cooper Road. John Elliott is in Newburyport, Mass. Bob Gleason has left Ithaca, N.Y., and is in Needham, Mass.; address, 727 Great Plain Avenue. Phil Haebler has moved from Larchmont, N.Y., to Montclair, N.J. Professor John Hale has left Knoxville, Tenn., and is in College Park, Md. Jimmie Harrop is in Baytown, Texas. Commander Adrian Marron is in Charleston, S.C. Clyde Norton is with Norton and Simmons, 285 Madison Avenue, New York. Russell Peirce is also in Newburyport, Mass. Colonel Ed Sullivan is with the United States Public Health Service, New Orleans. Ed Zahn's present address is 1 Highland Avenue, Great Neck, N.Y. — Bud Cofren has been very active in the development of the large and successful M.I.T. Club of Wellesley and he tells me that 1920 men have been very helpful in making this Club such a success, with monthly meetings attended by as many as 60 Alumni. Two of the organizers of the Club are Al Fraser and Jimmie Moir. Wilford Hooper is president of the Club this year and doing a grand job. Other active members include Ed McCarthy, Gorham Cross, Ken Akers from Needham, Oswald Cammann from Weston and Lucien Taylor from Dover.

Word has been received of the death of George Walmsley on July 16 at New Bedford, Mass., and of the death of Francis Randlett of Brighton on December 10. In recent years Francis had been in the Department of the Interior, Bureau of Fisheries. He leaves two children. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

• 1921 •

We hasten to revise last month's review of the Second Generation Club at Technology to include the name of Edward C. Facey, son of John A. Facey of Springfield, Mass. Ed is one of seven sons of 1921 to be admitted as freshmen for the current year. The total for all classes is 20, an increase of one over last year.

An article entitled, "Quick Call, Quick Action" in *Telephony* for January 22 says: "How a telephone lineman successfully foiled an attempt by the Japanese admiralty to upset production on this country's west coast during the recent war, is depicted by David O. Woodbury in his book *Submarine Warfare*, published by W. W. Norton & Company, New York."

In the technical sessions of the New York winter general meeting of the American Institute of Electrical Engineers early in February, Harold R. Blomquist, supervisor of engineering and research, United

Electric Railways Company, Providence, R.I., delivered a paper on "Trackless Trolley Operations in Rhode Island." Another speaker was Edward S. Dennison, director of research, Elliott Company, Jeanette, Pa., who chose as his subject, "Elliott Gas Turbine Developments Applicable to Power Generation." Serving as a member of one of the committees of the New York section, your Secretary had the pleasure of arranging for Y. W. Lee '27, associate professor of Technology's Department of Electrical Engineering, to lecture in the current series on the "Theory of Communication."

Chick Kurth sent the first secretarial committee letter of the month and followed it with another, chock-full of clippings. On behalf of the Class, we wish to extend sincerest sympathy to Chick and his family on the passing of his mother in December. Chick says, in part: "Harry Field visited me last summer when he came east and we had a fine get-together. Saint was here last fall in connection with a new product of Rogers Corporation. I ran into Herbie Nock, who is engaged in lighting fixture manufacture with Smithcraft of Chelsea, Mass. I bought a radio and television set from Joe Kaufman, who has a store on Providence Street, Boston. Joe deserves a good 'commercial' for his quality line of merchandise and his excellent service. No doubt you saw the *Saturday Evening Post* article about Larry Conant's success as a father-son leader in Washington. There was also a recent story in the Boston *Herald* about Al Wechsler, Hodgman Rubber Company, describing the growth of the town of Framingham."

Walter E. Church of the Portland, Oregon, architectural firm of Whitehouse, Church, Newberry and Roehr, and one of our most faithful correspondents, followed close on Chick's heels with: "Sorry not to have sent news for the February Review, but I have been laid up in the hospital and just got back to the office. My wife and I went to California to spend Thanksgiving with our youngest boy, who is a premedical student at Stanford, and I came down with the flu on my return to Portland. My second boy, Bill, is a first-year student in Architecture at Technology this year. His older brother, Dudley, was graduated from the Institute in 1947 in Chemical Engineering and is now with the Crown-Zellerbach Paper Corporation, Camas, Wash., in laboratory work. As to the Course IV group around here, Glenn Stanton was elected vice-president of the American Institute of Architects at the national convention in Salt Lake City. Irving Smith's firm, Office of P. Belluschi, has just completed two very interesting buildings which have received a great deal of national attention; the new Equitable Building and the new Oregonian Building. Jack Stanton, no relation of Glenn's, of the firm of Jacobberger, Stanton and Zeller, is busy with school work for the city right now. Our firm has the Lincoln block building under way here in Portland, the new State Office Building in Salem, and we are starting studies of the State Highway Building in Salem, which, with the Office Building, forms part of the State Capitol group. The last time I saw Harold Cake was at a meeting prior to one of the Uni-

versity of Oregon football games. Cookie is a great booster for the Oregon Ducks."

We appreciate the many fine Christmas greetings, among them those of Catharine and Harry Field, Wint Dean, Regina and Gus Munning '22, Ethel and Maxwell Burckett, Helen and Bob Miller with an exceptionally good (Graflex) photograph of the family, the Art Brambach's from Europe, Bill Loesch, Walt Church, Moose LeFevre, Frieda and Henry Kurth, Irv Jakobson, Lem Tremaine '23, Jack Keck '23, Helen and Bill Rose, Jack Barriger coupled with Indiana and the Monon, Graciela and Helier Rodriguez from Havana, Edna and Phil Coffin, San Hill, the Jacksons from their Maryland farm, and Helen and Ray St. Laurent. The attractive message from Elisabeth and Dugie Jackson includes the announcement of the marriage of their second son, David, last September.

Willard A. Emery reports that he is now associated with the Western Supply Company, 408 North Boulder Avenue, Tulsa, Okla. Promotion has come to Elliott B. Roberts of the United States Coast and Geodetic Survey, who is now a commander. Elliott makes his home at 18 Wetherill Road, Washington 16, D.C. George B. Wetherbee has moved to Portland, Maine, and Lansing T. Carpenter is now located in Haddam, Conn. Albert J. Kiley lives in Belmont, Mass., at 125 Claffin Street. Albert L. Edson, former manager of the Bedford, Mass., airport, wartime colonel and Air Transport Command base commander, has been made manager of the Boston Airport, according to the Boston *Herald*. Al, who was the manager of a much smaller Boston airport before entering the service in 1940, has a background of 20 years of airport management. A veteran of both wars, he was a pilot from 1917 to 1919 and successively air inspector and base commander for the Antisubmarine and Air Transport Commands in the last War. A native of Malden, Mass., he was an electrical instructor for the Veterans' Bureau following our graduation and, after six years as executive secretary of the Massachusetts Examiners of Electricians, he served as manager of the Boston Airport from 1929 until 1940. Married and the father of two children, Al lives at 102 Bellevue Street, West Roxbury, Mass.

Ray St. Laurent writes: "I had a delightful reunion with Frank Kittredge and also saw Sam Jones while we were attending meetings of the 10th New England Sales Management Conference. Frank was on the committee which arranged an excellent program. He is district sales manager for Jones and Laughlin Steel Corporation. I recently had a pleasant exchange of correspondence with Miles Zoller, Vice-president of Eagle-Picher Sales Company, Cincinnati, Ohio. He reported seeing Trev Peirce in Philadelphia and says he meets with Ollie Bardes almost every week to keep the old 1921 fires burning. With much sorrow I report the death of our classmate, Joseph M. Lurie on January 1. Joe has been our research director of Rogers Corporation for the past two years. Saul Silverstein and I have known Joe since our Boston English High School days and we have lost a real pal and friend as well as a business associate. Joe was a

native of Roxbury, Mass., where he was born on February 11, 1899. Before coming to Rogers, he had been with Bonafide Mills and W. S. Libbey Company in Maine. He leaves his wife, Gertrude, a daughter, Barbara, and a son, Robert, who is a freshman at the Institute."

It is with profoundest regret that we record the passing of Joe Lurie and another of our classmates, Ted Painter, and we express to the families of both our heartfelt sorrow in their great losses. Chester R. Painter, for 25 years with the Long Island Lighting Company, died at his home in Mineola, N.Y., on November 6, 1948. Born at Oyster Bay, N.Y., on May 8, 1898, he attended schools of the community and enrolled at Phillips Academy before entering Technology. After graduating in Course II, he was associated with the Kelly Motor Truck and Mack Truck Companies and started with the Long Island Lighting Company in 1923. District Commercial Manager until 1942, when he was assigned to special studies for the sales, education and research departments, he was appointed staff engineer of the transportation department early in 1948. He was interested in education and was, for six years, a member of the board of education of the Mineola District, Town of North Hempstead, serving as president of the board for one year. He is survived by his wife and two sons, Chester, Jr., and Randell.

We note that Brigadier General Edgar E. Hume was awarded the Gorgas Medal in recognition of his pioneer use of DDT on a mass scale to check a typhus epidemic raging in Naples, Italy. — Harry P. Field, Vice-president and Commercial Manager of the Hawaiian Electric Company, Ltd., Honolulu, Hawaii, made his first contribution as the newest member of the secretarial committee with a copy of the resplendent holiday edition of the *Paradise of the Pacific Magazine*, from which we learn that Harry is serving as an officer of Rotary International. He is a member and past president of the Rotary Club of Honolulu and previously served on the youth committee and as district governor.

L. George Horowitz sent a welcome letter, bringing his record up to date since his service as a lieutenant colonel, U.S.A. He was associated with the City Investing Company until early last year when he opened his own office in New York as an economics consultant. During the War, George served in large construction operations with the Office of Constructing Quartermaster, Atlanta, and as assistant to the Chief of Operations, Corps of Engineers, Washington, D.C. Subsequently, he was president of the Army Service Forces Publications Review Board in Washington and was then made assistant to the chief engineer, Services of Supply in India, where he was engaged in the construction of gasoline and oil pipelines. There followed a similar assignment in the European Theater of Operations, in which he saw service in London, Normandy and Paris. Prior to going on inactive duty in 1945, he had a special assignment in research on strategy, tactics and logistics.

Among those present at a New York class luncheon in January in connection with the M.I.T. Development Program

were Fred Adams, Tony Anable '20, Irv Jakobson, Warrie Norton, Larry Richardson, Bill Stratford, Dick Windisch, Dave Woodbury and your Secretary. April 2 is the day we honor Jim Killian '26 in Cambridge. Write me that you'll join the rest of the Class in greeting our new Prexy. — CAROLE A. CLARKE, *Secretary*, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

• 1922 •

Robert M. Arnold, a director of Allegheny Ludlum Steel Corporation since September, 1946, and president since 1941 of Arnold Engineering Company, a now wholly owned subsidiary of Allegheny Ludlum, has been appointed vice-president of the parent company. Arnold Engineering Company is the maker of the well-known Alnico magnets. — Your Secretary, in the December notes, without authority demoted Ab Johnson to vice-president of Warner Machine Products, Inc. He is hereby restored to his position of president as noted in the November notes.

The Class will learn with regret of the death of Colby W. Bryden on January 11, 1949. At the time of his decease, he was director of research for De Laval Separator Company. For many years he had been an active member of The M.I.T. Club of New York and, in addition, was a loyal attender of the five-year reunions. Another death to be reported is that of Harold R. Ten Eyck who died on December 4 at the Veterans Hospital in Amarillo, Texas, after a short illness. His home was in Orange, N.J. He is survived by his wife, Madeline Illingworth Ten Eyck and a daughter, Mary Jane Ten Eyck.

New addresses: Donald F. Carpenter, Room 4-E-724, Pentagon Building, Washington 25, D.C.; Earnshaw Cook, Goose Point Farm, Stevensville, Kent Island, Md.; George R. Hopkins 2252 Washington Avenue, Silver Spring, Md.; Dr. Samuel H. Manian, 5707 26th Street, North, Arlington, Va.; George R. Prout, in care of General Electric Company, Nucleonics Department, Hanford, Wash.; Brigadier General William F. Heavey, 3752 Del Monte Drive, Houston 19, Texas; George H. Rhodes, 260 Morris Avenue, Providence 6, R.I. — C. YARDLEY CHITTICK, *Secretary*, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

• 1923 •

I am pleased to report that the booklet giving an account of the 25th reunion of the Class is finally in the mails and should be in the hands of every member of the Class by the time these notes appear. Thanks are especially due to the reunion committee and to Bernie Proctor, who prepared the manuscript of the report. The report should be a very nice souvenir for those who were present and will be of interest to those who were not. The reunion report had to be mailed without the accompanying nominating committee report, as the nominating committee has not yet

sent the Secretary the result of its deliberations. This will be the subject of a special mailing when it is available, however.

The Boston firm of consulting engineers, Cleverdon, Varney and Pike, announced the admission to partnership of Lawrence J. Tracy on January 1. In November, Robert L. Hershey was appointed assistant general manager of the DuPont Company's ammonia department. He was on the staff of the Department of Chemical Engineering at the Institute from 1924 to 1936 and started with the DuPont Company that year at the Experimental Station in Wilmington. He has most recently been assistant chemical director of the ammonia department.

The Boston *Traveler* in December devoted a feature story to the appointment as rear admiral of Wesley McLaren Hague of the Boston Naval Shipyard. The *Traveler* story featured the fact that Admiral Hague started as a Navy enlisted man and was one of the first enlisted men appointed to the Naval Academy, from which he graduated in 1919 at the head of his class. Since graduation from the Institute, he has served in the naval shipbuilding centers throughout the country. — HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Battery-march Street, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

• 1924 •

Our Class was well represented at the alumni banquet on December 7. Among those present were Malcolm and Mrs. MacNaught, Ray Hamilton, Jack Hennessy, Nat Schooler, Greg Shay, Tom Bundy, Bill Keplinger and several others. Our drive fund is continuing at a fair pace, and I, personally, have written seven of our classmates enclosing pledge cards but as yet have heard from none, although I am hoping that they have sent their pledge cards direct to Uncle Horace in Cambridge. If not, will those of you who have received letters from me, and I daresay other members of the committee, likewise, please take immediate action?

Paul Cardinal is the junior vice-president of the Hoffmann-LaRoche Company in Nutley, N.J. He has been made vice-president in charge of the bulk vitamin division. This division is a very important one and beginning this year it will be a principal source for synthetic vitamin A. For complete details of Paul's pedigree, please see the *Technique*, 1924 edition. — A note from Bill Robinson states he has run into Si Simonds, who is chief engineer of the S S Mt. Mansfield of the American President Lines. This is a round-the-world freighter and Si seems to be having a grand time, although his travels will probably prevent him from attending our 25th reunion in Osterville, Mass. Let me remind any of you who have photographs or movie film taken during our gasping days at the Institute to please forward them to Bill MacCallum (W. H.) either in care of Modern Talking Picture Service, Inc., in Radio City, 9 Rockefeller Plaza, or at his residence in Ardmore, Pa., with a return address.

Paul Cardinal states that he recently ran into Frank Barrett, the telephone king in Providence; Ray Lehrer, who is heading up the Boston Regional Fund Drive; Chick Kane who is always looking out the window at the Institute; and Joe Naughton.

There is still plenty of discussion going on as to the risk involved when the committee eliminated the attendance of wives at our 25th reunion. As it stands now, we do not plan and do not have facilities to bring the wives down to East Bay Lodge. We will make reservations in a desirable Boston hotel for the girls who can join us at the All-Technology reunion on Saturday, June 11. We are still open and would like your thoughts on this subject. A letter to either Bill Robinson at the General Electric Company, in Cleveland, or George Parker in Newburyport, Mass., or the undersigned here in New York will be given due consideration I assure you. And again I urge you to *do it now* and send the pledge cards in. We cannot fail in reaching our goal of \$100,000 as a 25th reunion gift and we can and will make it. Please do your part and do it now. — FRANCIS A. BARRETT, *General Secretary*, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, *Assistant Secretary*, 330 West 42d Street, New York 18, N.Y.

• 1926 •

Strictly business: Richard H. Pough, for many years on the staff of the National Audubon Society, has become curator of the new department of conservation and use of natural resources at the American Museum of Natural History in New York. — Joseph C. Huske, who has been promoted to the rank of captain by the Navy, is in Ankara, Turkey, with the American Mission for Aid to Turkey. — William R. Franklin is now located in Reno, Nev., where he is general superintendent of the Walker J. Boudwin Construction Company. — The appointment of Philip Mancini as state public works director for Rhode Island was announced in the late fall.

Eyewitness report: "We had a grandstand seat for some of the excitement which accompanied the change in government in November," writes Whitney Ashbridge from Caracas, Venezuela. "Our offices are on the third floor of a busy corner overlooking the Capitol and the university, so that we saw a couple of demonstrations, some shooting and even wept when some of the tear gas was wafted up to our windows by the breeze. For several days there was a very strict curfew . . . and for a while the town was full of soldiers, tanks, and armored cars. Police with rifles and machine guns were on the tops of the high buildings downtown, including ours. . . . The army really handled the whole affair very efficiently, with precautions against looting, and there was remarkably little in the way of disturbance or bloodshed. We were extremely lucky that we were spared the wholesale destruction that took place several months previously in Bogotá."

The Secretary recently attended a meeting of the M.I.T. Club of Philadelphia

and was delighted to meet there a number of '26 men. They included Martin Bergen, Howard Humphrey, Dick Jones, Kenneth Lord, Bernard Morgan, Bob Richardson, and Franklin Washburn. Many of these were present with their wives, which made the occasion doubly delightful.

We record with deep regret the death of Elliot P. Rexford on October 16 in Los Angeles. He had been chief of the South Pacific division of the petrographic department of the Army Corps of Engineers and was recognized as an authority in the selection of proper aggregates in the manufacture of concrete for government dams. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

• 1927 •

The information contained in the February notes concerning Glenn Jackson was obtained directly from him and apparently modesty prevented him from giving the fuller story as here quoted from the New York *News Record* which also carried his picture; available on request: "Glenn D. Jackson, Jr., new member of the sales organization of North Carolina Finishing Co., Salisbury, N.C., as made known by W. T. Jordan, agent, with sales offices in New York, comes from 16 years with U.S. Finishing Co., the last 11 of which have been at its Sterling, Conn., Silver Springs and Pawtucket, R.I., plants in rayon fabric development sales, management and engineering posts. He was first employed by Slater Co., Webster, Mass., printer and finisher, and other concerns in industrial engineering work. During the recent war he was advisor to the armed forces in several committees, including nylon parachute fabrics, rayon fragmentation bomb parachutes, dyeing nylon OD 7, and after the war, was a member of the textile team sent to Germany."

"Well Deserved" is the title of a recent editorial in the Jamaica, L.I., press which refers to Westervelt A. Taylor's recent appointment. His address is 172-01 Sayres Avenue, St. Albans, L.I., N.Y. The editorial reads as follows: "District Attorney Charles P. Sullivan has made precedent in Queens in naming Westervelt A. Taylor of South Jamaica an assistant prosecutor. Never before has a Negro been appointed in Queens to a position of such high responsibility — a position requiring a strong educational background, experience in the law and zeal for public service. Mr. Taylor started out in life with an ambition to become an engineer. He was graduated from M.I.T., scholastically one of the finest schools in the country. After he received his degree in civil engineering, he decided to become a lawyer, earned his degree at Fordham Law School and entered the bar in Queens. As a practicing attorney for fourteen years, he has acquired an excellent reputation in the community. During these days when there are innumerable evidences of the efforts being made to implement the historic Civil Rights report of President Truman's committee, it is heartening to see another indication that in Queens, discrimination, based on differences in race, creed or color is disappearing."

The Alumni Association Directory for 1948-1949 records the following facts: Dwight C. Arnold is representative for the Class on the Alumni Council. Alf K. Berle, 69 Common Street, Dedham, Mass., is our Class Agent for the Alumni Fund Board. It also records the fact known to all that James A. Lyles, 29 Boulder Trail, Bronxville, N.Y., is class president. Your Secretary has been appointed manager of Shell's Aviation Department. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

• 1929 •

The 20th reunion committees are at work on big plans for June. Here is your best opportunity to see and be seen. The place is East Bay Lodge on Cape Cod and the time is June 12, 13 and 14. — FISHER HILLS, *Acting Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

• 1934 •

The month of June and our 15th class reunion are just a hop and a skip away. It hardly seems possible that almost five years have elapsed since the eventful get-together at Ye Castle Inn at Saybrook, Conn. You have all heard about the grand time that we had at the last reunion; the ball game between the married men and the bachelors, the banquet and entertainment in the evening and the relaxation in deck chairs on the porch overlooking the sound, while the boys reminisced over old times. Well, the coming reunion is going to be even bigger and better. Mal Stevens is chairman of the committee with Hank Backenstoss and Johnny Hrones handling the program and finances. This is just the nucleus of a much larger committee that will cover a great many functions that are planned to make the reunion a whopping success. You will receive a letter outlining some of the details very shortly so this announcement is just to tickle your interest, but now is the time to start making your plans and whetting your appetite for a genuine Technology get-together.

Francis M. Buresh of Blandford, Mass., got into the news not long ago for his development of a machine to manufacture nonwoven fabrics. His method covers a process of making nonoriented fiber webs on a continuous basis and combining them with plastics. Pilot plants have already been set up to put the process into operation. — Arthur J. Leydon was married in November to Mildred Grierson, daughter of Mrs. Grace E. Grierson of Waltham, Mass. Arthur is working as a research chemist at Dewey and Almy Chemical Company. The couple will live at 587 Lexington Street, Waltham.

We are very sorry to report the death of H. Clare Horwood on October 30 in Toronto, Canada. Dr. Horwood was a geologist attached to the Ontario Department of Mines since 1936. He was stricken while on a visit to Victoria and later admitted to Vancouver Hospital. He was former vice-president of the Junior Chamber of Commerce in Port Arthur and su-

pervised a program for a \$500,000 community center for that city. He was a director of the Rotary Club of Port Arthur and a member of the Association of Professional Engineers of Ontario, Society of Economic Geologists and Canadian Institute of Mining and Metallurgy. He was also a Fellow of the Royal Society of Canada and a member of the Masonic Order. He leaves his wife, Mary Helen, a son, Peter, and a daughter, Erin Patricia. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass.

• 1935 •

Bernie Nelson writes that on his discharge from the Army he returned to the New York Telephone Company, and is plant chief of a section of Buffalo. He and his wife have a daughter, Debbie, five, and live at 290 Roycroft Boulevard, Snyder 21, N.Y. Bernie reports seeing Walt Marshall in New York and Ken Holdom in New Jersey recently, also hearing from Carl Lavenas who is with Armco in Buenos Aires. Carl has a little girl aged five. Jeff Farmer is with a paper company in Waterville, Maine, and has a boy and girl, five and 10. Bernie met Jeff in Cairo, Egypt, during the War. Bob Forster has returned to Buffalo from New Jersey for Minneapolis-Honeywell Regulator Company and lives at 217 South Buffalo Road, Orchard Park. Johnnie Slosson, whose family comprises a wife and three youngsters, is with the J. H. Williams Company, Williamsville, N.Y. George Bull is another telephone engineer, with Pennsylvania Bell in Philadelphia. Dick Lawrence, who, incidentally, boasts of four little Lawrences, works for the United American Soda Fountain Company, Watertown, and lives at 5 Robin Lane, Exeter, N.H. Art King called on Dick last summer. Art, I believe, is still in the treasurer's department, the Mengel Company, Louisville, Ky. Jack Ballard's Christmas card, created by Miss Penelope Ann Ballard, aged five, shows Papa, Mama, Sister, and Brother Ballard. Papa has four hairs. Wonder how accurate that is? Jack is vice-president (manufacturing and engineering factotum) of Sterling, Inc., thermostatic traps and condensate pumps, Milwaukee. Jack's home address is 4867 North Newhall Street, Milwaukee 11. Mike Kelakos is with the Inter-Allied Reparation Agency, 455 Rue de la Loi, Brussels. Charlie Bowen has become a partner in Booz, Allen and Hamilton, business surveys and management counsel, 285 Madison Avenue, New York. Lars Anderson, after 12 years with Gillette, has embarked on a career as sports impresario or what-have-you. He is president of Sports Centers of New England, Inc., operators of an artificial ice rink in Lynn and soon to be owners of a basketball, boxing, wrestling, exhibitions and conventions arena at the same location. Seating capacity will range from 3,000 to 4,000. Lars should be able to scrape up some complimentary tickets for classmates.

To Roy P. Whitney, who received his bachelor's degree with our Class and stayed at the Institute to receive a master's degree in 1937 and the Sc.D. in 1945, came national recognition from the Ameri-

can Institute of Chemical Engineers for his contributions in the field of chemical engineering. During the War, Whitney worked in the chemical warfare service at the Institute and then became acting head of the chemical engineering department at the University of Maine. Since 1947 he has been research associate at the Institute of Paper Chemistry at Appleton, Wis.

Helen Teresa Walsh of Larchmont, N.Y., daughter of Mr. and Mrs. William Thomas Walsh became the bride of William H. Poisson. Poisson is a graduate of the New Bedford Textile Institute as well as Technology, and is now chemical engineer with the Burlington Mills. He served with the Army in the South Pacific during World War II. — Oscar F. Wiedeman is research chemist with the American Cyanamid Company, having been transferred from the laboratories of that company to the Azusa, Calif., plant to direct development of a new experimental plant.

Hal Bemis, Wesley H. Loomis, and Leonidas P. Whorton are members of the Institute's Committee on Financing Development, whose work and initial meeting are recorded in the December and January issues of *The Review*. This committee is charged with the responsibility of raising twenty million dollars for additional endowment and new buildings for the Institute. As editor of *The Review*, Dudley is ex officio member of the committee on public information of the Financing Development Committee. — Now that you have read these items, how about a few lines of your own? — J. BARTON CHAPMAN, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

• 1937 •

Lawrence Cyr has just been made a member of the firm of George C. Funk Company of Boston, architects and engineers. He received the American Institute of Architects' Medal in school for the student who was the most successful in completing the course. Since he left school he has worked in many of the most recognized architectural offices in the country, including the office of Walter Dorwin Teague, N.Y. — Ray Bliss is married and doing research work in the University of Tucson, Ariz. Irv Tourtellot is in Denmark still with the same dock company, we understand. Henry Guerke is back at the home office of Bethlehem Steel Company where he is in the sales department. The source of the above is Bob Fischel, who is in a most interesting venture; a company called Roto-wing with offices in Washington. He owns two helicopters and does orchard and crop dusting along the East Coast. — Sidney A. Whitt is now vice-president of engineering for Cordley and Hayes, a pioneer water cooler company. Mr. Whitt carried on his advanced work at Technology with a Tau Beta Pi postgraduate fellowship and a full scholarship.

The class gift committee has received only 50 returns, as of January 15, from the questionnaires sent out on December 1. The committee hopes that many more of you will have expressed your opinions before this issue of *The Review* goes to

press. If you have not done so, please drop a note to J. S. Heal, 39 Tower Road, Hingham, Mass., letting him know what your ideas are. The gift and the method of obtaining it should represent the feelings of the majority of the Class. In the meantime, we are obtaining more detailed information on the insurance plan, which over 85 per cent of those who have replied favor. We are also studying alternate methods of assuring the Institute a substantial cash gift from the Class at its 25th reunion; only 13 years from this June. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. WALTER T. BLAKE, *Assistant Secretary*, Research Products Development Division, Pillsbury Mills, Inc., Minneapolis, Minn.

• 1938 •

On New Years Day, Dave Wright was married to Elizabeth Cocke. They are living in Manhattan. Another class marriage was that of Kitty Ethel Ward to Irwin Freyberg. Our Class has also had several additions to report. We have word of Ed Hadley's fourth child in September but know no more. How about it, Ed, is it a boy or girl? On October 8, Fred and Polly Kolb had their second child, another daughter, Katherine Priscilla Kolb. And lastly, on January 18, Don and Phyllis Severance had their second child, also a daughter, Patricia.

This column has not extended its official congratulations to Don Severance on his new office, Secretary-Treasurer of the Alumni Association. We're very fortunate in having Don as a classmate and if we will co-operate, he can help our Class to go places. Let's get behind him. Another appointment of one of our classmates has just been announced. Bob Johnson is chairman of the banquet committee for Alumni Day, 1949. Another reason to make an effort to be there, men. For those of you who are following Scott Lyon, he is now with the State Department in Moscow. He and his wife have an apartment facing the Kremlin. Paul Black is back in Boston and has started work with Andrew Alford, a consulting engineer. He and his family, wife Ruth, Peter, age six and Paula, age two, will be living in Wakefield. Warden Hartman, Jr., has been appointed manager of the contract operations department of the Armstrong Cork Company's building materials division. He will direct the planning, supervision, and execution of all erected contract work pertaining to Armstrong's Industrial Insulation. He joined Armstrong in 1940 as a salesman attached to the New York office of the building materials division. On his return from military service in 1945, he was appointed administrative assistant in Armstrong's Industrial Insulation Department in Lancaster, Pa. — ALBERT O. WILSON, JR., *Secretary*, 32 Bertwell Road, Lexington 73, Mass. RICHARD MUTHER, *Assistant Secretary*, Methods Engraving Council, 822 Wood Street, Pittsburgh 21, Pa.

• 1940 •

T. A. Edwards sent in a nice letter as follows: "My first job after graduation from Course III was with the Alan Wood

Steel Company located in Dover, N.J. This company is fundamentally a steel company but had an iron ore mine in Dover, N.J.; it was magnetite. My first job with them was a "flunky" and that is what I was, in the concentrator mill. I stayed in the mill for six months and then was offered a spot in the engineering department. This job consisted of running underground surveys in the mine along with any other general engineering work that came along. This included drafting, map making, design layout for installation of new machinery, and so on. In July of 1941 I had an offer from the Eimco Corporation to come with them as a sales engineer for mining equipment and also industrial equipment. The pay was good in comparison to what I was making, and I left Alan Wood with their best wishes. I have been with Eimco since that time, except for 18 months in the Navy from September, 1944. I have found the work with Eimco most interesting and diversified. I found shortly that we were not just sales engineers, but service men, installation men, engineers, applications engineers, and diplomats. I have traveled for this company all over the eastern seaboard, into the iron ranges in Michigan, Minnesota, Wisconsin, in the Birmingham iron country and in the Tri-State area where the lead-zinc field is located. My territory is actually the entire eastern seaboard and east of the Mississippi from Canada to the Gulf, with a few exceptions. I spend about 90 per cent of my time traveling and like it a great deal.

"In case you are not acquainted with Eimco, they make the world famous Rockershoovel which 90 per cent of the metal mines in the world have in operation. As you well know from previous letters I got married in October, 1943, and now have two children, both girls; one is three and a half and the other eight months old. After I got out of the service I found that I had to buy a house if I wanted to live somewhere and we bought a place in Westbury, Long Island. While in the Navy I spent most of the time going to school. The Navy decided to make me an aviation electronics technician mate. I got out as a third-class petty officer. Barring unforeseen contingencies and what have you, I shall probably stay with Eimco and grow with them.

"I understand that Ralph N. Thompson, who took up chemical engineering and a business option is now located in Pittsburgh, Pa., working for the Hagen Corporation, the Calgon division. He is heading up their laboratory on finding uses for Calgon in the paper and pulp industries. He bought a house in Mt. Lebanon, Pa., and likes his job very much. He anticipates a great future with this company. Ralph has a daughter who is about four years old. You may not have heard but J. O. Ellis, III, is married. Exactly where he is living I do not know at this time. (Secretary's note: Where are you Ellis? You are Course III Secretary, you know.) I have yet to get back to a class day at the Institute but hope to, at least for the tenth reunion. I enjoy reading the 1940 class column and hope that the coming year will find you with enough information so we will not miss even one issue."

Willard L. Morrison, Jr., has resigned the position of co-ordinator of industrial design for Montgomery Ward and Company to become chief engineer of Magnetic Power, Inc., of Wilmington, Del. Mr. Morrison will be responsible for the development and production of new products controlled by the Wilmington firm. He previously was in charge of product development for the West Bend Aluminum Company. — Members from the Waterbury area heard John H. Hollomon of the research staff of the General Electric Company speak at a meeting of the Connecticut section of the American Institute of Mining and Metallurgical Engineers held at Yale University late in the year. — C. E. Shannon will receive the Morris Liebmman Memorial Prize at a meeting of the 1949 convention of the Institute of Radio Engineers to be held in early March. — From Norman Klivans comes a card with the following information. He says that he started up an ill-fated household chemical business a year ago and sold out in the spring of 1948. He is now in the furniture business with his brother. Norm and his wife, Alice, bought a home in University Heights, Cleveland, and they had a little boy, Norman, Jr., on October 14. He says that Greg Bry and his wife, Adelaide, were over for Thanksgiving. He also sends me word that Bill Stern announced the birth of a boy on November 27, and Dave Jacobson '41 married Ruth Ness on November 19. Tom Creamer writes as follows: After harping on other members of the Class to send in their autobiography, I always have a guilty conscience when each issue of The Review is received and I realize another issue has gone by without my long overdue letter. With the risk of boring some of those whom I have not seen since June, 1940, I should perhaps start at the Institute where I was privileged to serve as Dr. Compton's assistant, first as a civilian for two years and then in a Navy uniform. In November of 1943, I was reassigned to Washington, attached to Dr. Compton's Office of Field Service in the Office of Scientific Research and Development. I was not released from the Navy until April, 1946, during which time I spent a few interesting months in the new Office of Naval Research.

Now, strange to relate, I am working for the National City Bank of New York at the head office. I started here in May, 1946, and after a year of training in banking operations, I was assigned to a group of officers handling the bank's business in Ohio, Indiana and Michigan where I travel approximately one week of every month. Although not of a typical M.I.T. nature, I am enjoying and finding the work interesting. Last Christmas I was made an officer, just like ensigns in the Navy, and although I can't give you samples of our products, George Wemple '37 is in the same group and we will always do our best for fellow Alumni. — As for my family life, my wife, Janet Waters Creamer, Wellesley '39, and I are most happily located in Scarsdale, N.Y., where we bought what we think is a very comfortable house, there being nothing to rent at the time we moved to New York. Soon after our arrival we were joined by a

daughter, now over two years old, and just prior to Christmas last year, a son, Thomas Chase. We ski in the winter and play tennis and golf during the other three seasons. — From time to time I see Chappie Halstead, Del Churchill, Hans Otto, John McGuigan, Bob Dobson and Dud Follansbee, who are working in New York.

Before closing, I want to thank the faithful supporters of the Alumni Fund. I see your contributions come through each month and although I would like to thank each of you personally, I just never get around to it. — H. GARRETT WRIGHT, *General Secretary*, Garrett Construction Company, Main Post Office Box 629, 510 Sherman Avenue, Springfield, Mo. THOMAS F. CREAMER, *Assistant Secretary*, 6 Berkeley Road, Scarsdale, N.Y.

• 1941 •

Luke Hayden, who turned banker upon his return from the Navy, recently has been appointed assistant secretary of the Syracuse Savings Bank. Lou had been employed at the Federal Shipbuilding and Drydock Company in Kearny, N.J., before going into the Navy. He is now working towards an M.S. in finance at Syracuse University. A picture of Herb and Mrs. Moody and Les and Mrs. Corsa appeared on Christmas cards filtering through to your Secretary, just a reminder of recent weddings of classmates in 1948. Cynthia and Warren Myers are also doing nicely in Ludington, Mich. Greetings from the Gavins portrayed the two young ones. And from a former bachelor, Ivor Collins: "Am now secretary-treasurer of the M.I.T. Club of Schenectady and try to get in some news every month; really a heavy concentration of classmates, with Joe Quill as president and others around like Ben Thorn, Rea Stanhouse, Walt Aker, Julius Kohn, Bob Mayer, Don Marquis, and Stan Webber, all working for General Electric. Joe is an application engineer, chemical and petroleum division and has one son, Stephen. Ben Thorn is in Turbine Sales and is married. Rea is in the Creative Engineering Program, is married and has one daughter, Dorene. Walt is in the aeronautics and ordnance systems division, Apparatus Department, is married and building a house. Jules is in the same division. Bob is also in this division, is married, has two children and is building a house. He was the Coffin award winner for outstanding engineering achievement in 1947. Don is section engineer of the mechanical development section, control systems division, General Engineering and Consulting Laboratory, is married and has one daughter. Stan Webber is a research associate in the Research Laboratory. Had cards from Carl Aronsen, Bill Fox, and Bob Montana, but without any news attached. As for me, I'm still with the Turbine manufacturing division, and busy."

Suzanne Carreau became Mrs. Carl Mueller in New York recently, with Bob De Martini ushering. Dion Jump became Mrs. John MacLeod with Jerry Coe '42 standing by as usher. Leon Crane is now chief flight engineer at Piasecki Helicopter Corporation and is playing nursemaid to shafting gears, hubs, rotor blades, and all the rest of the headaches that go to make

up a helicopter. Leon is married and has two boys. 'Tis all for now. — STANLEY BACKER, *General Secretary*, 101 Providence Road, Primos, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

• 1942 •

According to a restrained account in the Dallas, Texas, *Times-Herald*, Tex Noyes has married Earlene Jaster of Dallas. Apparently, Jonathan is now a law student at the University of Texas. The present oil boom in Utah, which I learn of through the Salt Lake City *Telegram*, is said to be due largely to the efforts of Paul T. Walton. The Lawrence, Mass., *Tribune* announces the appointment of Warren Kaye to the research staff of the University of Vermont and State Agricultural College in Burlington, Vt., and the San Francisco *Chronicle* notes that Jack R. Benjamin is among six new professors at Stanford University's School of Engineering.

American students at Cambridge University have selected Lloyd Trefethen, XIII, S.M., as president of their undergraduate society. Joseph H. Altman has been married in Rochester, N.Y., to Miriam Jeanne Block of Rochester, according to the Rochester papers. Our old standby, the Marlboro *Enterprise*, contributes two items: that George Granitsas is the new production manager and assistant superintendent of Buck Brothers in Millbury; and concerning the wedding in Marlboro of Eleanor M. Grandy of Dedham to Wallace S. Murray of Jacksonville, Fla. Finally, the Bellows Falls *Times* notes that in November, Alan B., and Mrs. Macnee spent a week end with friends in Bellows Falls. Oh, yes! Brad Darling tells me that Pete Sibley has come back to New England and is working for the Foxboro Company. The reason is, reportedly, nostalgia for skiing on the hills of New Hampshire. Pete now has two sons. Brad also reports that Jack Finger recently became the father of a bouncing baby girl and is teaching mathematics at Newton High School. — GEORGE M. KAVANACH, *Acting Secretary*, Room 4-055, M.I.T., Cambridge 39, Mass.

• 1944 (2-44) •

Plans are being made for our 5th reunion which is to take place on June 10, 1949, in the Campus Room of the Graduate House. This is the Friday evening before Alumni Day. We are expecting a big turnout for our first real reunion. This affair will be stag with suitable refreshments and entertainment. Mal Kispert has taken over the entertainment problem so that any of you with ideas should direct them to him. We want this party to be a memorable occasion so let us have your suggestions.

I received a Christmas card from Bob Wood and find that he is in Arvida, Canada. He is working for the power department of the Aluminum Company of Canada at their Shipsham development on the Saguenay River. Ed Peterson has been located again. He has decided that the Air Force offers a good future, and we find him now at Wright Field in Ohio studying

a course in engineering science at the United States Air Force Institute of Technology. The purpose of the Institute is to educate officers in the fields of engineering to assure effective research, development and procurement for the United States Air Force. Joe Crowley is now engaged to Marcia Sickels of Brookline. Joe at the present time is with the Instrumentation Laboratory at the Institute. Bob Barnaby has married Jane Inglis of Orange, N.J. Pierre Boucheron was one of the ushers. They plan to live in Caldwell, N.J. James Lawson was married in December to Nancy Van Anden of Scarsdale, N.Y., and is working for the International Business Machines Corporation in Englewood, N.J.

Just recently I ran into Fred Blatz at the Oxford Grille in Cambridge. I found that he is in Boston working for the Cities Service Corporation. He has been in their training course for the past year. He is living in the Deke house at Technology. A letter from Lou Demarkos informs me of his marriage to Jane Nason of Roslindale, Mass. Lou is with Lessells and Associates in Boston working as a consulting mechanical engineer. Soli Dubash'47 is now in Ontario, Canada, with the Steel Company of Canada in the capacity of mechanical engineer. Maxcy Daggett'46 is in Little Rock, Ark. He has been publishing a monthly aviation magazine and traveling around Arkansas, Tennessee and Mississippi in two airplanes which he owned successively. Maxcy said that he began to get hungry so last September he gave up the publication and went to work for a mechanical engineer in Little Rock to do air conditioning and heating on a commercial basis. John Dawson is located in Louisville, Ky., Dick Garrard is in Montclair, N.J., and Bill Jack is with the Kellogg Corporation in New York City. Ken Joseph is in Granby, Conn., and Norman Knapp is in Royal Oak, Mich. A letter from Warren Mathews'43 tells of his coming marriage to Betty Uptegrove of Maplewood, N.J. She has just recently returned from the Hawaiian Islands and is working for the New York *Herald Tribune*. Warren is working for the Bell Telephone Laboratories as an engineer in the radio research department. Dick Vail married Betty Beers in California. Betty is a graduate of Pomona College and recently received her doctorate at Columbia. Dick just graduated last June from the Harvard Business School where he got his M.B.A.

Alvin Bradshaw has taken off for Zurich where he will attend the Swiss Institute of Technology for two years and major in higher mathematics. John Burdakin married Jean Moulton of Wollaston, Mass. She is a graduate of Radcliffe and they plan to make their home in New Jersey. John is presently employed as an engineer for the Pennsylvania Railroad. — WILLIAM B. SCOTT, *General Secretary*, Mellon C-41, Harvard Business School, Boston 63, Mass. MALCOLM G. KISPERT, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

• 1945 (6-45) •

A letter from Bob Bronson arrived with several items pertaining to classmates.

Bob was married in Texas, back in 1946, to Helen Afflerbach. They now have two children, a boy one-and-a-half-years old and a girl four months. They are living in Erie, Pa., where Bob is working with the American Sterilizer Company. He has also been teaching electricity at night school two nights a week. Bob tells that the Don Buells are the proud parents of an eight pound, twelve ounce boy, Ralph Forrest. Don is with United Aircraft in Sunnyvale, Calif. Dick Martin is married and he and his wife are living near Harvard Square. Dick is working at the Institute. W. Stanley Smith is in the soap business working in Kansas City for Proctor and Gamble and is still single. Don Strang is with General Electric working at the Erie plant in the summer and at Schenectady in the winter. Bob Black is with Westinghouse in Buffalo.

Recent among the marriages was that of Red Harrington and Jane Nagle. Red is with Shell Oil of New York and plans to live in East Orange, N.J. S. Murray Moore, 3d, was married to Barbara Ann Wallace. Murray graduated from the United States Coast Guard Academy after leaving Technology. He is now an ensign stationed aboard the United States Coast Guard Cutter *Cherokee* at Norfolk, Va. Malcolm Schoenberg and Leona Goldberg were married in Philadelphia last September. Another marriage is that of Lloyd Nilsson and Ruth Benjamin. They are living in Akron, Ohio, where Lloyd is a design engineer for Goodyear Tire and Rubber Company. Jim Brayton is engaged to Ellen Kiskaddon of River Edge, N.J. Jim is in Boston helping the Turner Construction Company put up the John Hancock building. Dick McManus married Barbara Clapp last November. He is with United Shoe Company in Boston and lives in Swampscott. John vonHemert and Cristobel Locke were married in New York. John is with the Socony-Vacuum Oil Company. John Atwood and Doris James were married in Attleboro. Homer Eckhardt is engaged to Mary Grinnell of Tiverton, R.I. Ed Whittaker was married to Ruth Heller and is now with International Telephone and Telegraph Corporation, New York. A note from Bob Maglathlin in Alexandria, Va., says that he is now with Melpar Electronics. — DAVID P. FLOOD, *General Secretary*, 57 Beech Street, Framingham, Mass. THOMAS A. HEWSON, *Assistant Secretary*, Hartford Street, Dover, Mass.

• 1947 •

In addition to the recent news that would normally make up the contents of your class notes, Claude Brenner has just forwarded a bag full of news clippings which accumulated over the summer months. Therefore, in an effort to give you all the factual information possible, we'll keep the comments to a minimum. Listed below are last summer's additions to the Ball and Chain Club, together with their new "bosses." Harry Robinson to Ruth Melville of Abington, Mass.; Joe Nowak to Alfreda Lucille of Chicopee, Mass.; Ben Brewster to Anne Withington of Brookline, Mass.; James Duke to Barbara Ann Pierce of Rochester, N.Y.; Leonard Harris

to Nancy Cohn of South Orange, N.J.; Bob Zaworski to Priscilla Ring of Locke Mills, Me.; John Taft to Nancy Jacocks, of Branford, Conn.; Frank Worssam to Katherine Wetmore of Cambridge; Robin Stevensen to Barbara Miller of Wakefield, Mass.; Charles Reynolds to Anne Maclay of Newport, R.I.; Jim Robertson to Dorothy O'Hearn of Chestnut Hill; Sam DiSavino to Virginia Saporito of Newark, N.J.; Bob Wilson to Hannah Broomell of Germantown, Pa.; Alexander Bohr to Patricia Graham of Arlington, Mass.; Dick Seaman to Nancy Steffens of Scarsdale, N.Y.; Bill Moore to Dorothy Stokes of Boston; Ted Davis to Nancy Chapin of Wellesley Hills; Morgan Cooper to Daphne Tait; Allen Sweeny to Virginia Bennett of New Kensington, Pa., and James Finney, Jr., to Ann Stryker of Greenwich, Conn.

During the summer a large number of engagements were also announced, of which many should probably be recorded under the marriage listing. As we can't print what we don't know, however, we'll have to assume that the status of the following is still engaged. Sidney Smith to Edith Leonard of Exeter, N.H.; Dick Saville to Harriet Bristol of Burlington, Vt.; Phil Solomon to Frances Horwitz of Dorchester; Ed Coan to Barbara Smith of Norwalk, Conn.; Bob Auriema to Carol Brodie of Pembroke, Mass.; Thomas Cummings to Mary Stewart of New Wilmington, Pa.; Edward Merrill to Genevieve de Bidart of Paris, France; Carl Newman to Mildred Bachrach of New York and Pete Poulos to Helen Siganos.

The following bit of incidental intelligence came out in the *Detroit News* last April. Hoping to refute the old idea that "smart youngsters burn themselves out early," the paper started to look into the histories of the Chicago Quiz Kids of radio fame. One of the graduates of that famous program whose accomplishments were listed is none other than your Class Secretary, Claude Brenner; or as the *Detroit News* puts it, "the South African born lad with the smooth British accent."

Last June, John Fennessey, now class of '50 at Tufts Medical, was presented a \$500 award by the Guild of St. Luke. He was voted the grant-in-aid for original research which he carried out last summer at the Institute's Department of Biology. Lieutenant Colonel John U. Allen, M.S. in Civil Engineering, was appointed, early last summer, to the position of staff engineer for Headquarters, Twentieth Air Force on Guam. A more recent item is the November announcement by the Pittsburgh Regional Planning Association in which Bill Froehlich, Jr., was named chief planning engineer of the group. The field of education is still absorbing the interest of two of our graduate students. Earl Anderson, who worked here as a research associate while obtaining his S.M. in Civil Engineering, was named last month as assistant professor of civil engineering at the University of Massachusetts. Arman Fred-

erickson, who received his Ph.D. in Geology here after three and one-half years in the Navy Air Corps, is now assistant professor of geology at Washington University, St. Louis. A report from the Stanolind Oil and Gas Company at Tulsa says that C. S. Minden, M.S. in Chemical Engineering, is now employed in their research department at the general office in Tulsa; and Bill Coombs, Jr., joined the engineering and maintenance department of the Eastman Kodak Company last summer after receiving his M.S. in Science and Economics.

We were very pleased to receive Dick Mooney's Christmas card. He is usually good for at least one visit a year back to these ivyless covered walls and is a wonderful source of class news when he drops around. We managed to tear Dick Knight away from Dewey and Almy long enough last week to have a quick lunch with him. Dick, now a sales engineer, has been traveling the length and breadth of the United States lately but has managed to keep his roots in New England; Scituate on the South Shore, to be exact. After an extensive European tour last summer, Margareta Backer '48 has returned to her native habitat and the New England Conservatory of Music where she is majoring in singing. Vin Haneman and Howie Zwemer, both of Course XVI, are also taking a firm grasp on the New England soil. They are working in the new Supersonic Wind Tunnel here, and we manage to see quite a bit of them and their spouses. Every so often, when the wind from the west is just right, a jovial little extrovert in the person of Bud West blows into Boston from Worcester for an evening's festivities. Accompanied by his wife, Betty, and daughter, Nancy, he manages to brighten the faces of his Boston classmates until the cool gray hours of the dawn. A final note just arrived from John Bender, who with his wife, Mary Jane, and at least two daughters, appears to be storming the bastions of Middle West industry. After graduating from Course XV, John accepted a position at the Manhattan State College in Kansas. He has recently been appointed to a post with the Topeka Chamber of Commerce as industrial commissioner. All well rated concerns seeking an excellent location in the mid-west may contact John immediately. We'll wind up this month's notes with this late list of wedding announcements: Donald Anderson, now employed by a major oil company in Wood River, Ill., was wed last November to Ruth Van Amburgh of Plymouth, Mass. Last August, the *New York Sun* stated that Alexander Vagliano would exchange vows with Shirley Lynch next summer in Paris. In November, the *New York Times* stated that the wedding was set for December 17 in New York City. As we've heard nothing since then, you can take your pick of the dates. The marriage of Art Blechstein and Ruth Rasp, whose engagement we noted here in De-

cember, took place recently in Newtonville. John Ripley wed Nancy Gould of New York City and Noroton, Conn., and Donald Cottle wed Geraldine McCarthy of Cambridge. Eric Grubb married Charlotte Davis of Brighton and they reside in New Hope, Pa. Ed Mickevicz, a research engineer with the Naval Ordnance Laboratory, White Oak, Md., married Georgene M. Harris of Long Island City, N.Y., in November and last but by no means least, is the wedding of Charlie Hansen, one of Phi Beta Epsilon's finest, to very attractive Joan Gunning of Arlington, Mass. — JAMES L. PHILLIPS, *Acting Secretary*, Room 7-133, M.I.T., Cambridge 39, Mass.

• 1948 •

At last a letter has been received from our long silent senior class prexy, Ken Parmelee. He and his charming wife, Gisela, are now in New York City where Ken, a Course VI man, is studying law at New York University and, concurrently, is working for a patent law firm. Two of our classmates have joined the Park Works division of the Eastman Kodak Company. George Stewart is an industrial engineer and Stanley Jensen a chemical engineer. Speaking of pairs, Leonard Frisoli and Henry Morgan have both gone with the Fabric Research Laboratories here in Boston. Also close at hand is John Kirkpatrick, who is with the Arthur D. Little Company in Cambridge.

Farther from home are Lee Cahn, a research group leader for the Askania Regulator Company in Chicago; Dick White, a management consultant with Kurt Salmon Associates in Washington, D.C.; and Bob Mayne, who is working with a new 2,000,000-volt Van De Graff x-ray machine in the treatment of cancer at the American Oncologic Hospital in Philadelphia. Vic Johnson who, incidentally, has been a married man now for almost a full year unannounced by us, is in the research department of the Carrier Corporation in Syracuse, N.Y. — and what are *you* doing?

We have our share of marriages and engagements to announce again this month. Hoyt Battey was wed to Jean Davis; James Leahy to Mary Sue Bee; Bill Nemitz to Dorothy O'Brien; and Nichols Caldwell to Polly Carver. Engagements of which word has been received are those of Bill Barnes, now with Goodyear in Akron, to Phyllis Morlock; Bob van Ravenswaay, with United Engineers and Constructors of Philadelphia, to Janette Batton; Earl Rittenhouse to Mary Foran; George Wong to Madeleine Yip; Bob Cook to Sheila Whitestone; Russell Gwillim to Elda Ewing; and Tom Kelly to Mary Ann Lane.

For another month, then, so long — and write. — WILLIAM R. ZIMMERMAN, *General Secretary*, 1604 Belmar Road, East Cleveland 18, Ohio. RICHARD H. HARRIS, *Assistant Secretary*, 263 Harvard Street, Cambridge 39, Mass.

ALUMNI DAY, SATURDAY, JUNE 11, 1949



This
MANHATTAN
Belt . . . gave
22 years
continuous service

. . . traveled **1,448,864** miles

The 18-inch, 5-ply Manhattan Transmission Belt pictured here was held in storage over 4 years, followed by 22 years of actual service. It operated a line shaft in the machine shop of the Huntington and Broad Top Mountain Railroad and Coal Company. This drive is nearly vertical which means that a higher than normal belt tension had to be maintained to prevent slip.

We quote directly from a letter from Mr. F. E. Steele, Superintendent:

"It is my personal opinion that this is a remarkable service for a belt of this type when we take into consideration the fact that drive pulley was 14 inches in diameter. This within itself would throw considerable strain on a belt of this width and weight, also with a speed of approximately 2,383 feet per minute. During this period of operation we had no trouble whatsoever and at all times the belt worked very satisfactorily."

A lacer accident finally ended its career.

"Should this accident not have happened, the belt would still be in service and doing a good job."

This is one of many case histories to which Manhattan can point for proof of Workmanship and Quality Materials . . . reasons why Manhattan has long been famous for its belts. Whatever the job, there's a Manhattan Belt that will lower *your* costs, too.

A SINGLE SOURCE for a COMPLETE BELTING LINE

Manhattan offers a range of four driving tension surfaces on rubber transmission belts. Also Endless Cord, Non-Spark, Oil-Proof and Acid-Proof constructions. Belts can be factory-made endless or field vulcanized

by the Condor-Weld method. All Manhattan endless belts have the patented Extensible-Tip outer-ply splice which prolongs belt life considerably. Literature on request.



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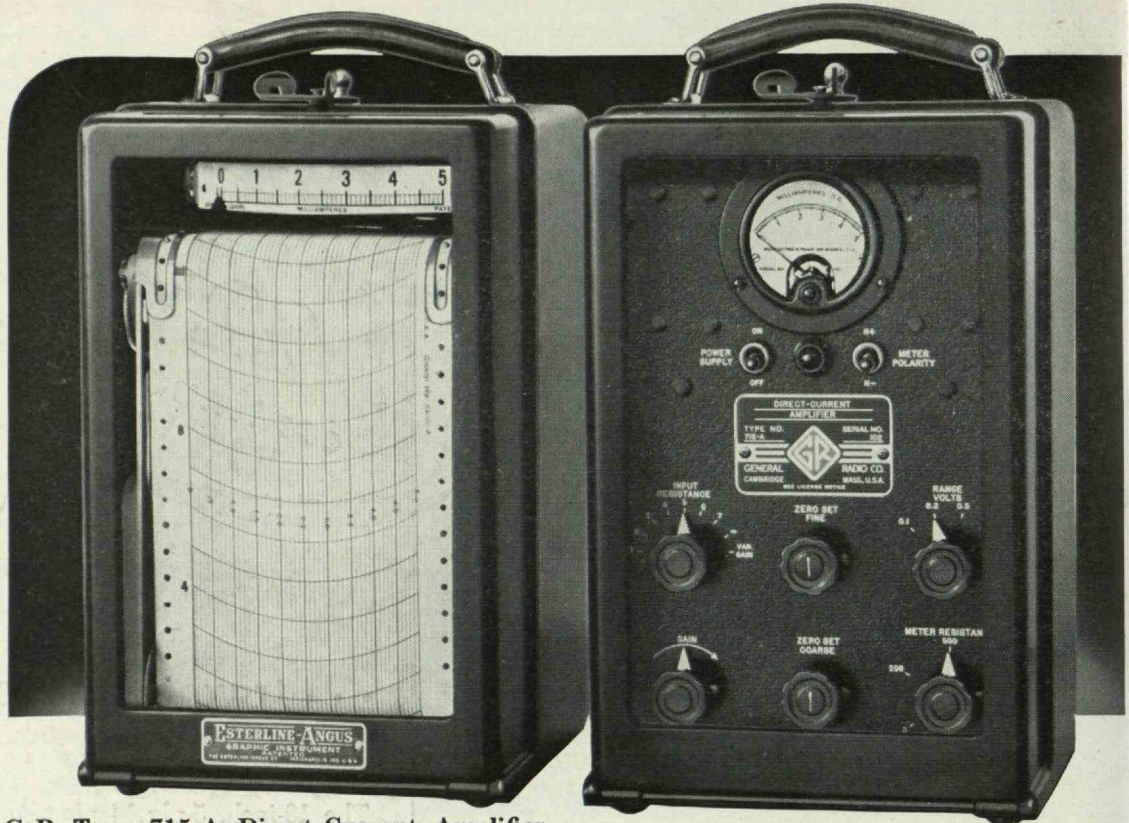
Thomas H. Boyd, '23

Wilder E. Perkins, '25

Charles P. McHugh, '26

Albert W. Beucker, '40

For CONTINUOUS Recording of Small Voltages and Currents



• The G-R Type 715-A Direct-Current Amplifier was designed particularly for operation with the Esterline-Angus 5-milliampere recorder to be used as a calibrated recording voltmeter. With appropriate selection of built-in input resistances the combination also is a recording milliammeter or microammeter.

The amplifier can be used in automatic process control circuits where its output operates relays to control the device which feeds the input of the amplifier. It may be operated from frequency meters, sound and vibration measuring equipment, photoelectric cells, resistance strain gauges, resistance thermometers and other similar devices.

The Type 715-A D-C Amplifier has high gain, operates from an a-c line, is very simple to use, requires practically no attention, can be used for very long periods for continuous recording, is exceptionally free from effects of line voltage variation, and has a wide range of built-in input voltage and resistance combinations.

Full-scale output has been made 5 milliamperes to operate the 5 m-a recorder. This full-scale output can be obtained on calibrated ranges from input voltages of 0.1, 0.2, 0.5 and 1.0 volt. The input resistance can be varied between 100 ohms and 10 megohms in powers of 10 by means of a panel switch.

The amplifier is supplied either in a cast metal case to match the Esterline-Angus recorder, or in a walnut cabinet.

SPECIFICATIONS

RANGE: Four switch selected calibrated ranges supplying 5 m-a linear output in recorder circuit for input voltages of 0.1, 0.2, 0.5, and 1.0 volt.

ACCURACY: Approximately 1% as a calibrated voltmeter.

INPUT: From 100 ohms to 10 megohms, in powers of 10, to adjust input resistance and permit use of instrument as calibrated millivoltmeter or microammeter. Short- and open-circuit positions on selector switch. For over one volt input variable gain control provided to adjust voltage to desired value. Input resistance is then about 150,000 ohms.

GRID CURRENT: In input circuit is less than 0.002 microampere.

OUTPUT CIRCUIT: Designed to operate 5 m-a meter on panel, or Esterline-Angus 5 m-a recorder. Provided with compensating resistance to match external device to normal resistance of 1,000 ohms.

TYPE 715-AE D-C AMPLIFIER
(Metal Case) \$345.00
TYPE 715-AM D-C AMPLIFIER
(Walnut Cabinet) \$300.00



GENERAL RADIO COMPANY Cambridge 39, Massachusetts

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